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A taxonomic revision of *Caryocolum* (Lepidoptera: Gelechiidae)

Peter Huemer

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Synopsis

The Holarctic genus *Caryocolum* Gregor & Povolný, 1954, is revised, described and redefined; a total of 63 species is currently recognized; 15 new species are described; 18 new synonymies are established; 8 species are transferred to *Caryocolum* and one to *Ephysteris*; four species are reduced to subspecific rank. Keys to the species are provided and the adults and genitalia are figured. The systematic position of *Caryocolum* is discussed and a provisional cladistic analysis is given, based on such structures as the apomorphic transtilla region and sclerotizations of the ductus bursae. Data on the biology, as far as known, are included and host-plant relationships within the genus are discussed.

Introduction

The genus *Caryocolum* comprises 63 species, mainly distributed in mountainous areas of the Palaearctic and to a lesser extent in the Nearctic Region. About two-thirds of the species occur in Europe; however, it is expected that some undescribed taxa from Central Asia remain to be discovered.

In Austria 47·9% of the Macrolepidoptera are included in the 'Red list' (Gepp, 1983). Although little is known, it is suspected that the situation is even worse in Microlepidoptera, particularly because of their host specificity and strongly restricted habitats. *Caryocolum* species are specialized on plants of the family Caryophyllaceae. It is to be expected that much of the genus is endangered in the Alps as well as in other regions. The type-locality of *C. leucothoracellum* (Klimesch), for example, is extremely endangered (Schramayr, 1986) and so are many other localities. Therefore this study aims to summarize todays knowledge about *Caryocolum* to aid effective conservation.

Species of *Caryocolum* cannot be recognized exclusively on external characters although the white and black fore wing pattern is usually rather distinctive. Determination problems are compounded by the extraordinary individual variation and numerous geographic forms. Species have therefore often been misidentified in the past and many literature references are dubious.

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Caryocolum species were already treated as a taxonomic unit within the genus *Gelechia* Hübner by Stainton (1867) and within *Lita* Treitschke by Heinemann (1870), but Stainton erroneously included *Scrobipalpa costella* (Humphreys & Westwood). Meyrick (1925) included species of *Caryocolum* within the genus *Phthorimaea* Meyrick. Pierce & Metcalfe (1935) figured the genitalia of the British species and placed them in a group 'A' of *Phthorimaea* whereas group 'B' included the genera *Scrobipalpa* Janse and *Gnorimoschema* Busck. A partial revision of the European taxa by Klimesch (1953–1954) included 41 species, placed in the genus *Gnorimoschema*. Gregor & Povolný (1954) initially described *Caryocolum* as a subgenus of *Gnorimoschema*, but later it was raised to full generic rank by Gozmány (1958).

This paper is the first revision to include all the known *Caryocolum* species. Primary types have been examined in most cases, resulting in the discovery of 16 new species, 15 of which are named in this paper. Furthermore, 18 new synonymies are established and eight species are combined with *Caryocolum* for the first time. Lectotype designations are made when necessary. Keys to the species are provided and complete descriptions of the facies and genital characters are given. Photographs of the wings should only be used as a rough guide for identification. For the first time the genitalia of *Caryocolum* are figured using an unrolling technique during preparation. Comparability and correct interpretation of highly diagnostic characters (e.g. valva and sacculus, posterior margin of the vinculum) are much improved and some previously misinterpreted structures such as the transtilla region and the anellus sclerotizations can now be interpreted correctly. The phylogeny of *Caryocolum* is discussed, using cladistic methods.

Material and techniques

Male genitalia were dissected using an unrolling technique similar to that described by Pitkin (1986), but slightly adapted for *Caryocolum* (Huemer, 1987*b*). The abdomen was macerated for 5–7 min. in 10% KOH heated in a waterbath. Rinsing in distilled water was followed by cleaning and removal of the abdominal scales with a snipe-feather in 30% ethanol. After staining in mercurochrome for about 5 min., the genitalia were separated from the abdomen and the aedeagus was removed after perforating the anellus membrane. Then the vinculum-valva complex was separated from the tegumen on the right lateral connection (ventral view) using micro-pins mounted in handles. The flat-lying parts were dehydrated in absolute alcohol, then transferred into euparal essence; finally the genital-complex was embedded in euparal with the dorsal (inner) side of the vinculum uppermost.

Female genitalia were usually prepared in standard position. In some species, particularly those with dorsal processes on the eighth segment, the dorsomedial membrane of the eighth segment was severed to enable unrolling (Huemer, 1987*b*).

These methods of genital preparation made it possible to examine and illustrate important structures in corresponding positions. Furthermore the results of photomicrography were distinctly improved as all the diagnostic characters could be shown in the same plane of focus in one photograph.

This study is based primarily on the collections of the British Museum (Natural History) and unless otherwise stated, all examined material is preserved in the BMNH. Additional material was received from many institutions and private collections. Numerous specimens bear my determination labels. Primary types are cited under the species headings and, as far as they were actually studied, at the beginning of the examined material. The countries listed under 'Distribution' are based on material I have examined unless otherwise stated. This material is cited at the end of each species, arranged in an alphabetical order of countries. Provinces and regions are cited where appropriate. The spelling of locality names follows *The Times Atlas of the World* (Comprehensive Edition, 1968), unless there was good reason to proceed otherwise. Significantly different spellings on labels are cited additionally. Data from sources other than the specimen labels are given in square brackets.

Fore wing measurements are given from the base to the apex, to the nearest half millimetre. Exceptional sizes are given in parentheses. The length of the female apophyses posteriores is only measured in a few species where it is of diagnostic value. The left-hand wings of all the

species are illustrated. If these were unsuitable, the right hand wings were photographed and the images reversed. The magnification of genitalia photographs varies interspecifically except those of the female signa which were taken at the same magnification. Photographs of the aedeagi are more enlarged than those of the male genitalia. Data on the biology are based mainly on bibliographic references, but occasionally on my own observations. The botanical nomenclature follows Tutin *et alii* (1964–1980).

The species-group names of *Caryocolum* usually end in diminutive suffixes -ella or -cella and therefore form compounds from nouns. According to the *International Code of Zoological Nomenclature*, Article 31 (b) (ii), names that are compound nouns retain the same ending whatever the gender of the generic name with which they are combined. Therefore the spelling of only a few species-group names had to be changed.

Abbreviations of institutions

BMNH	British Museum (Natural History), London, U.K.
ETH	Eidgenössische Technische Hochschule, Entomologisches Institut, Zurich, Switzerland
LN	Landessammlungen für Naturkunde, Karlsruhe, West Germany
MNHN	Muséum national d'Histoire naturelle, Paris, France
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin, East Germany
NM	Naturhistorisches Museum, Vienna, Austria
NMNH	National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A.
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria.
TM	Természettudomány Múzeum, Budapest, Hungary
ZI	Zoological Institute, Academy of Sciences, Leningrad, U.S.S.R.
ZM	Zoologisk Museum, Copenhagen, Denmark
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich, West Germany

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Finally my special gratitude is expressed to my wife Ingrid for the arrangement of the plates.

Check-list of *Caryocolum*

CARYOCOLUM Gregor & Povolný, 1954
- ***fischerella*-group**
  - ***fischerella*** (Treitschke, 1833)
- ***tischeriella*-group**
  - ***tischeriella*** (Zeller, 1839)
- ***alsinella*-group**
  - ***alsinella*** (Zeller, 1868)
    - *albifrontella* (Heinemann, 1870)
    - *tristella* (Heinemann, 1870)
    - *semidecandriella* (Tutt, 1887)
    - *semidecandrella* (Threlfall & Stainton, 1887)
  - ***viscariella*** (Stainton, 1855)
    - *albifaciella* (Heinemann, 1870) **syn. n.**
    - *behenella* (Constant, 1890) **syn. n.**
  - ***vicinella*** (Douglas, 1851)
    - *inflatella* (Chrétien, 1901)
  - ***bosalella*** (Rebel, 1936) **comb. n.**

***sciurella*-group**
sciurella (Walsingham, 1908)
rubidella (Chrétien, 1908) **syn. n.**
***nepalense*-group**
nepalense Povolný, 1968
***longiusculum* sp. n.**
***vartianorum* sp. n.**
***tetrameris*-group**
tetrameris (Meyrick, 1926) **comb. n.**
***paghmanum* sp. n.**
***mongolense*-group**
mongolense Povolný, 1969
***amaurella*-group**
amaurella (Hering, 1924)
viscariae (Schütze, 1926)
***oculatella*-group**
oculatella (Thomann, 1930)
ochraceella (Thomann, 1929) homonym
***petryi*-group**
petryi (Hofmann, 1899)
rougemonti (Rebel, 1907) **syn. n.**
benanderi (Hering, 1933)
repentella (Chrétien, 1908)
***afghanum* sp. n.**
***majus* sp. n.**
splendens Povolný, 1977
sp. A
***saginella*-group**
inflativorella (Klimesch, 1938)
xuthella (Rebel, 1940) **syn. n.**
census (Gozmány, 1954)
saginella (Zeller, 1868)
coussonella (Chrétien, 1908)
cauligenella (Schmid, 1863)
***trauniella*-group**
trauniella (Zeller, 1868)
peregrinella (Herrich-Schäffer, 1854) **comb. n.**
melantypella (Mann, 1877) **syn. n.**
fiorii (Klimesch, 1953) **comb. n.**
***provinciella*-group**
provinciella (Stainton, 1869)
***mucronatella*-group**
mucronatella (Chrétien, 1900)
poschiavensis (Rebel, 1936) **syn. n.**
***simulans* sp. n.**
***leucomelanella*-group**
***abhorrens* sp. n.**
leucomelanella (Zeller, 1839)
gypsophilae (Stainton, 1869) **syn. n.**
***immixtum* sp. n.**
leucothoracellum (Klimesch, 1953)
schleichi schleichi (Christoph, 1872)
syriacum Povolný, 1977 **syn. n.**
schleichi dianthella (Chrétien, 1925) **stat. n.**
hackeri Derra, 1985 **syn. n.**
schleichi improvisella (Rebel, 1936) **stat. n.**
schleichi arenariella (Benander, 1937) **stat. n.**
***marmoreum*-group**
marmoreum marmoreum (Haworth, 1828)
manniella (Zeller, 1839)
marmorella (Doubleday, 1859)
marmoreum pulchrum (Wollaston, 1858) **comb. n., stat. n.**
pullatella (Tenström, 1848)
pulla (Tengström, 1848)
subtractella (Walker, 1864) **syn. n.**
livoniella (Teich, 1898)
agricolaris (Meyrick, 1933) **syn. n.**
protectum (Braun, 1965)
***stramentella*-group**
stramentella (Rebel, 1935) **comb. n.**
***emarginatum* sp. n.**
***fraternella*-group**
***hispanicum* sp. n.**
***confluens* sp. n.**
fraternella (Douglas, 1851)
intermediella (Hodgkinson, 1897)
***interalbicella*-group**
klosi (Rebel, 1917)
interalbicella (Herrich-Schäffer, 1854).
quadrella (Fabricius, 1794) homonym
delphinatella (Constant, 1890)
laceratella (Zeller, 1868) **comb. n.**
thurneri (Pinker, 1953) **syn. n.**
***nearcticum* sp. n.**
blandella (Douglas, 1852)
blandelloides Karsholt, 1981
horoscopa (Meyrick, 1926) **comb. n.**
jaspidella (Chrétien, 1908)
proximum (Haworth, 1828)
maculiferella (Douglas, 1851)
horticolla (Peyerimhoff, 1871)
blandulella (Tutt, 1887)
tricolorella (Haworth, 1812)
contigua (Haworth, 1828)
acernella (Herrich-Schäffer, 1854)
***fibigerium* sp. n.**
junctella (Douglas, 1851)
aganocarpa (Meyrick, 1935) **syn. n.**
***kasyi* sp. n.**
***extremum*-group**
***extremum* sp. n.**
***cassella*-group**
cassella (Walker, 1864).
melanotephrella (Erschoff, 1877) **syn. n.**
albifasciella (Toll, 1936) **syn. n.**
subvicinella (Hackman, 1946) **syn. n.**
falellum Piskunov, 1975 **syn. n.**
***huebneri*-group**
moehringiae (Klimesch, 1954)
petrophilum (Preissecker, 1914)
kemnerella (Palm, 1947)
huebneri (Haworth, 1828)
hubnerella (Doubleday, 1859)
knaggsiella (Stainton, 1866)
kroesmanniella (Herrich-Schäffer, 1854)

Taxa excluded from *Caryocolum*

Some species of gelechiid moths were erroneously placed in *Caryocolum*:
Klimeschiopsis kiningerellum (Herrich-Schäffer) (e.g. Gozmány, 1958: 205)
Scrobipalpa costella (Humphreys & Westwood) (Gozmány, 1955: 315)
Ephysteris bucolica (Meyrick) **comb. n.** (Povolný, 1977*b*: 430)
Gelechia scotinella Herrich-Schäffer (Gozmány, 1955: 315, as *lakatensis* Rebel)
Gelechia sestertiella Herrich-Schäffer (Gozmány, 1955: 315)
Bryotropha tachyptilella (Rebel) (Gozmány, 1955: 315)

Host-plant selection of *Caryocolum* species

Numerous gelechiid taxa are associated with particular host-plants. The predominant host-plant families of the tribe Gnorimoschemini are Compositae, Solanaceae, Chenopodiaceae, Zygophyllaceae and Gramineae. The larvae of several genera such as *Tila*, *Cosmardia*, *Pogochaetia* and *Caryocolum*, as far as known, feed exclusively on Caryophyllaceae, a host-plant selection which also reflects the close relationship of these taxa. *Sattleria dzieduszyckii* (Nowicki) on *Silene acaulis* and *Cerastium latifolium*, occasionally on Saxifragaceae, may also be a member of this group. *Scrobipalpa salinella* (Zeller), a Chenopodiaceae feeder not closely related to *Caryocolum* etc., is found exceptionally on *Spergularia*. Outside the Gnorimoschemini only a small number of Gelechiidae are associated with Caryophyllaceae, for example, *Eulamprotes wilkella* (Linnaeus) on *Cerastium fontanum triviale* (Stainton, 1867: 266).

The plant family Caryophyllaceae is divided into the subfamilies Paronychioideae, Alsinoideae and Silenoideae (Tutin *et alii*, 1964–1980). At present the host-plants of 33 species of *Caryocolum* are known. Two species feed on Paronychioideae, 20 on Alsinoideae and 17 on Silenoideae. Most of these *Caryocolum* species are highly specialized, reflected by 25 genus or species monophagous taxa. However, observations are still limited. Oligophagy on all subfamilies of Caryophyllaceae has been recorded for *C. vicinella* (Douglas) only. *C. provinciella* (Stainton) feeds on Paronychioideae and Silenoideae and *marmoreum* on Alsinoideae and Silenoideae. The larvae of only 6 *Caryocolum* species have been found on more than one genus within a subfamily.

Morphologically, *Caryocolum* can be separated into two divisions. This is usually corroborated by host-plant relationships within the divisions and the species-groups. Division A feeds on Silenoideae, the *alsinella-*, *provinciella-*, *mucronatella-* and *marmoreum*-groups additionally on other Caryophyllaceae. Division B is recorded exclusively from Alsinoideae. The close relationship of species within species-groups is frequently reflected in their host-plants. Species of the *petryi*-group occur on *Gypsophila*, the *saginella*-group causes galls on *Silene*, and the *leucomelanella*-group has only been recorded from the closely related genera *Petrorhagia* and *Dianthus*. Apparently, the choice of host-plants does not change significantly within the range of a species. Geographical host-plant differences are usually confined to species level: *C. petryi* feeds on *Gypsophila repens* in the Alps whereas it is recorded from *Gypsophila fastigiata* in central Germany and Sweden; *C. schleichi* has adapted to various species of *Dianthus* in different parts of its range, forming several subspecies. Only a few *Caryocolum* species utilize more than one host-plant genus within an area: *C. vicinella* has been found on *Spergularia* and *Silene* in Sweden, on *Petrorhagia*, *Cerastium* and *Silene* in Austria and exclusively on *Silene* in Britain. Species feeding on *Cerastium* or *Stellaria* could occur on both genera, a fact which has been observed in *fraternella* and *tricolorella* throughout their area; *C. junctella* feeds on *Stellaria* in central Europe but is recorded from *Cerastium* in China.

The larvae of many *Caryocolum* species feed within spun shoots, leaves, seed-capsules and flower-buds. Early instar larvae have frequently been recorded as leaf miners. Internal feeding also occurs in the form of stem-boring, a habit which often causes galls. Some species hibernate as young, mining larvae, but it seems likely that the ovum is the usual hibernating stage. Only *junctella* is known to hibernate as an adult. Moths of *Caryocolum* have been found from April to October and as far as known all species are univoltine except *provinciella* which has two generations. However, further species with long flight periods may also be bivoltine.

Table 1 Host-plant selection of *Caryocolum* species.

Species of *Caryocolum*	Host-plants of *Caryocolum* larvae		
	Caryophyllaceae		
	Paronychoideae	Alsinoideae	Silenoideae
Division A			
fischerella-group			
fischerella (Treitschke)			*Saponaria*
tischeriella-group			
tischeriella (Zeller)			*Silene*
alsinella-group			
alsinella (Zeller)		*Minuartia, Cerastium*	
viscariella (Stainton)			*Lychnis, Silene*
vicinella (Douglas)	*Spergularia*	*Stellaria, Cerastium*	*Silene, Petrorhagia*
amaurella-group			
amaurella (Hering)			*Lychnis*
oculatella-group			
oculatella (Thomann)			*Gypsophila*
petryi-group			
petryi (Hofmann)			*Gypsophila*
repentella (Chrétien)			*Gypsophila*
saginella-group			
inflativorella (Klimesch)			*Silene* galls
saginella (Zeller)			*Silene* galls
cauligenella (Schmid)			*Silene* galls
provinciella-group			
provinciella (Stainton)	*Herniaria*		*Silene*
mucronatella-group			
mucronatella (Chrétien)		*Minuartia*	
leucomelanella-group			
leucomelanella (Zeller)			*Petrorhagia* galls, *Dianthus*
schleichi (Christoph)			*Dianthus*
marmoreum-group			
marmoreum (Haworth)		*Cerastium*	*Silene*
protectum (Braun)			*Silene*
Division B			
fraternella-group			
fraternella		*Stellaria, Cerastium*	
interalbicella-group			
klosi (Rebel)		*Stellaria*	
interalbicella (Herrich-Schäffer)		*Cerastium*	
laceratella (Zeller)		*Moehringia*	
blandella (Douglas)		*Stellaria*	
blandelloides Karsholt		*Cerastium*	
proximum (Haworth)		*Stellaria, Cerastium*	
blandulella (Tutt)		*Cerastium*	
tricolorella (Haworth)		*Stellaria, Cerastium*	
junctella (Douglas)		*Stellaria, Cerastium*	
cassella-group			
cassella (Walker)		*Stellaria*	
huebneri-group			
moehringiae (Klimesch)		*Moehringia*	
petrophilum (Preissecker)		*Cerastium*	
huebneri (Haworth)		*Stellaria*	
kroesmanniella (Herrich-Schäffer)		*Stellaria*	

The systematic position of *Caryocolum*

Species of *Caryocolum* were originally described in *Gelechia* Hübner, *Lita* Treitschke, *Phthorimaea* Meyrick and *Gnorimoschema* Busck, or exceptionally in *Recurvaria* Haworth, *Aristotelia* Hübner and *Bryotropha* Heinemann.

Gregor & Povolný (1954) described *Caryocolum* as a subgenus of *Gnorimoschema*. Later it was raised to a genus within the tribe Gnorimoschemini of the Gelechiinae (Gozmány, 1958).

The classification of the Gelechiidae is still based mainly on that of Meyrick (1925) who divided the family into nine genus-groups which now have subfamily rank. Most of the gelechiid subfamilies and genera are poorly defined, and so is the Gelechiinae including the tribes Gelechiini, Gnorimoschemini and Teleioidini. An important character of the Gelechiinae which is only shared by a few other gelechiid taxa is the male eighth segment. The tergite and sternite are separated into free flaps, and one pair of long hair-like coremata, closely attached to the tergite, is present. These structures also occur in *Caryocolum*, indicating a close relationship to the Gelechiinae. Within the Gelechiinae, *Caryocolum* shares, with the tribe Gnorimoschemini, characters of highly diagnostic value, e.g. the strong hook-like signum of the female genitalia, whereas it differs from the Teleiodini and Gelechiini in many genital characters.

Caryocolum is considered as a monophyletic entity because of its modified transtilla region. Within the Gnorimoschemini, *Caryocolum* belongs to a morphologically and ecologically separate group of genera, characterized by a tendency towards reduction of the gnathos hook, frequent development of the anellus sclerotizations, and larvae which, as far as known, are specialised on Caryophyllaceae. This group of related genera includes *Pogochaetia* Staudinger, *Tila* Povolný, *Cosmardia* Povolný, *Klimeschiopsis* Povolný, *Agonochaetia* Povolný and *Lutilabria* Povolný, although the host-plants of the last three are unknown. *Sattleria* Povolný also belongs to this complex, its larvae having been found on Caryophyllaceae and Saxifragaceae. *Caryocolum* differs from *Tila*, *Pogochaetia*, *Agonochaetia*, *Lutilabria* and *Sattleria* in the hook-like signum of the female genitalia. In the male genitalia it is distinguished from *Tila* by the shape of the saccus, from *Pogochaetia*, *Agonochaetia*, *Lutilabria* and *Sattleria* by the distinctly shorter valvae. *Pogochaetia* and *Sattleria* also differ from *Caryocolum* in the presence of a gnathos hook.

Caryocolum is here placed next to *Cosmardia* and *Klimeschiopsis* with which it shares a signum-hook and a high overall similarity in male and female genitalia. It is distinguished from *Cosmardia* by the absence of a gnathos hook, from *Klimeschiopsis* by the pillow-like rather than shovel-shaped culcitula, a less emarginate tegumen, shorter valvae and the shape of the signum.

Classification of *Caryocolum* species

A reconstruction of the phylogeny of *Caryocolum* was attempted using cladistic methods. Character polarities were estimated by outgroup comparison (*Cosmardia*, *Klimeschiopsis* and other Gnorimoschemini) but this was not always possible and therefore the polarities of some character states are doubtful. Autapomorphic states of characters for individual species were rejected, except where they were presumed to include convergence or reversal. Numerous states could not be estimated as the males of three and the females of ten species are unknown. The classification of *Caryocolum* is frequently corroborated by host-plant selection and biology (e.g. larvae causing galls). However, the biology of less than half of the species is known and therefore these characters are rejected for the present.

The evidence for monophyly of *Caryocolum* is not very strong and based mainly on character 1. Some other characters, such as the reduction of a gnathos hook, the development of anellus sclerotizations, the shape of the signum and the host-plants (Caryophyllaceae), are probably synapomorphic for the included species. Further material of *Caryocolum* and related genera is required to resolve fully the relationship within this genus.

The cladogram (Fig. 1) is derived from the character matrices (Tables 2 and 3), which mainly include genital characters. A character analysis demonstrates that *Caryocolum* can be separated into two divisions (characters 2, 3, 29–31). Particularly, the phylogeny of division A of *Caryocolum* is still far from resolved as the available characters are insufficient. The large

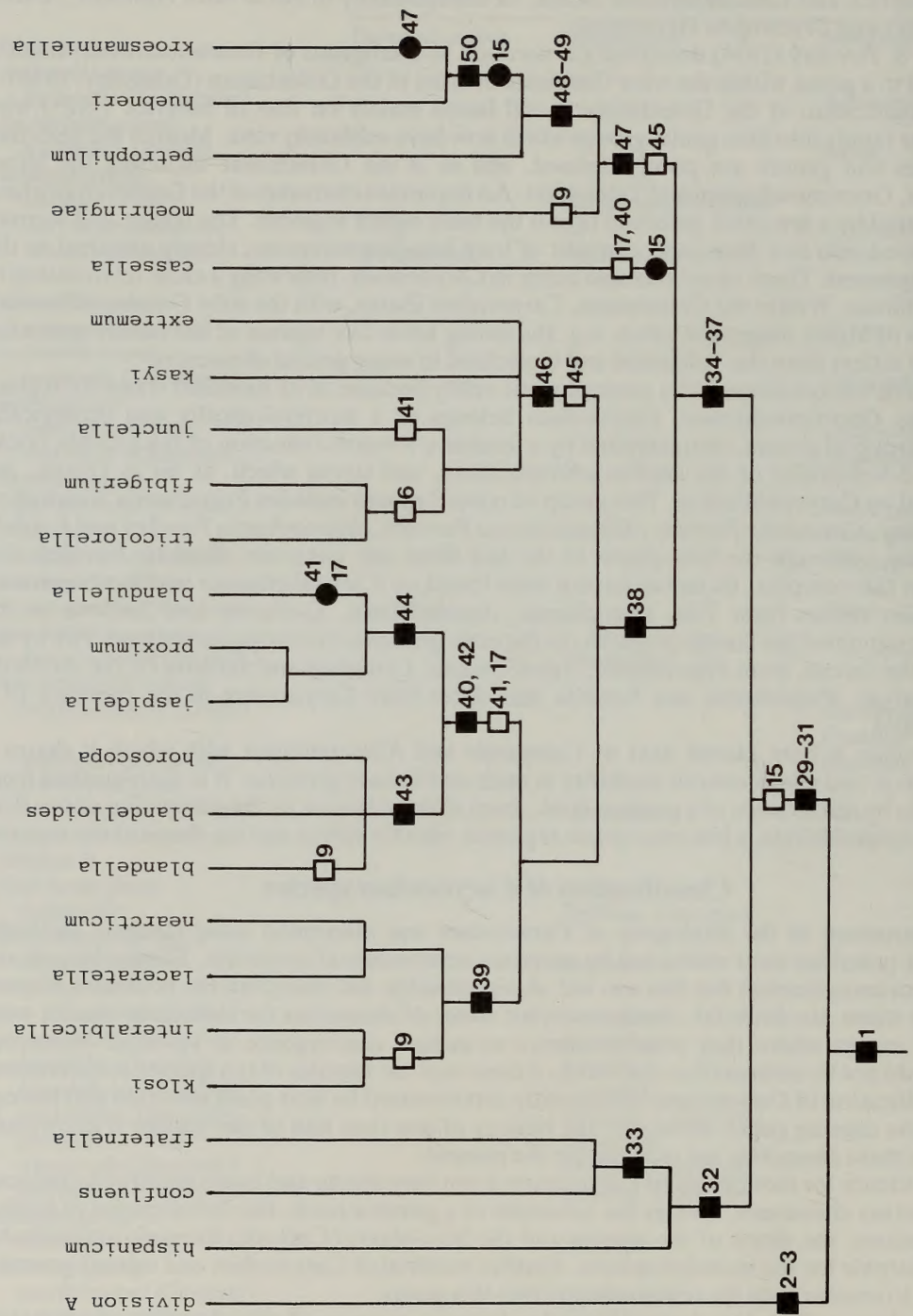

Fig. 1 Cladogram representing proposed phylogeny within *Caryocolum*. Numbers refer to characters explained in text. Characters 4–28 are presumed apomorphies of subsections of division A and are not marked on the cladogram. Black squares denote presumed apomorphies, open squares denote presumed convergences, black circles denote presumed character-reversals.

number of species within this division made it desirable to subdivide it into species-groups, of which several can be defined as probably monophyletic by some presumed apomorphies, whereas the character states of other shared similarities are unclear. Division B of *Caryocolum* is divided into two groups (characters 32 and 34–37). The *fraternella*-group is presumed to be monophyletic. Further material is required in the *interalbicella*-group, which is defined by the apomorphic state of character 38, to resolve the relationships fully. *C. kasyi* and *extremum* are highly apomorphic in many characters and the latter is treated as a separate species-group. The relationships of *cassella* are not fully resolved, hence the trichotomy in Fig. 1.

The characters used in classification are listed in sequence. The presumed apomorphic state is described first, and the plesiomorphic state second. The variation, occurrence and significance of the characters is commented upon.

1. Transtilla strongly sclerotized/transtilla membranous. The apomorphic state of this character is lacking in other Gnorimoschemini. The development of spines is a further apomorphic state (see 15). A weakly sclerotized transtilla occurs in some species-groups and could be explained as secondary reduction or more likely as underlying synapomorphy.
2. Aedeagus with minute cornuti/aedeagus without cornuti. No cornuti have been observed in other Gnorimoschemini. The apomorphic state of this character is restricted to division A of *Caryocolum*. Character reversal is stated for the *nepalense*-group.
3. Posterior part of ductus bursae with a pair of lateral sclerotizations/posterior part of ductus bursae without a pair of lateral sclerotizations. The apomorphic state of this character is restricted to division A of *Caryocolum*. However, short sclerites in the posterior part of the ductus bursae are also developed in *cassella*.
4. Posterior margin of vinculum with pair of lateromedial incisions resulting in a pair of distinct medial processes/posterior margin of vinculum almost straight, without distinct processes. The apomorphic state is expressed in the *alsinella*-group. This character has further apomorphic states (see 5 and 27). It is plesiomorphic in division B of *Caryocolum* and weakly developed in *fischerella* and *tischeriella* which are regarded as the most primitive species in division A.
5. Posterior margin of vinculum with pair of rounded lateromedial emarginations/posterior margin of vinculum straight.
6. Anellus with pair of long needle-shaped sclerotizations/anellus without or with short peg-like sclerotizations. Sclerotizations of the anellus region seem to be a synapomorphy for the Gnorimoschemini feeding on Caryophyllaceae and were observed in *Pogochaetia*, *Agonochaetia*, *Tila* and *Sattleria*. Short peg-like sclerites were found in many species-groups of *Caryocolum* but they are difficult to discern. However, long needle-shaped sclerotizations are only developed in the *alsinella*-group and in *provinciella*, *tricolorella* and *fibigerium*.
7. Lateral sclerotizations of ductus bursae long, reaching about three-quarters length of eighth female segment/lateral sclerotizations of ductus bursae short or absent. This is a further apomorphic state of character 3.
8. Antrum reduced/antrum a short ring or funnel. The antrum is a typical ring-shaped colliculum in numerous Gnorimoschemini. It is completely reduced in the *alsinella*-group with the exception of *vicinella*, in *oculatella* and the *marmoreum*-group.
9. Apophyses posteriores long (at least 2·0 mm)/apophyses posteriores short (0·8–1·9 mm). This is a weak character which is represented as a convergence in many species of *Caryocolum*.
10. Female eighth segment with two pairs of strong parallel longitudinal folds ventrally/female eighth segment without pairs of parallel folds. This and the following character define the *petryi*-group as probably monophyletic.
11. Antrum extremely broad and large, almost extended to apophyses anteriores laterally/antrum short ring- or funnel-shaped.
12. Aedeagus long, slender/aedeagus short, stout. The aedaegus is elongated independently in some other Gnorimoschemini but it is short in the genera closely related to *Caryocolum*. However, this character is not very reliable within *Caryocolum*.
13. Aedeagus strongly S-curved/aedeagus almost straight. The apomorphic state of this character is restricted to *petryi* and *repentella*.

14. Sacculus hammer-shaped/sacculus digitate to knife-shaped. The apomorphic state of this character is expressed in the *tetrameris*-group.
15. Transtilla spinose/transtilla without spines. The occurrence of a spinose transtilla is considered to be a convergent development in *petryi*, *repentella*, the *saginella*-group, the *stramentella*-group and in division B of *Caryocolum*.
16. Head and thorax white/head and thorax dark. The apomorphic state of this character is shared by *cauligenella* and *saginella*, the *trauniella*-group and some individual species. A white head and thorax was not observed in the out-groups.
17. Female eighth segment with strongly sclerotized, ovate ventromedial plate/female eighth segment sclerotized throughout ventrum. The occurrence of a sclerotized ovate ventrum in species of division A is considered to be a convergent development unrelated to the ovate ventral plates in some species of division B of *Caryocolum*.
18. Ventromedial plate of eighth female segment sinuate laterally, rounded posteriorly, surrounded by strong folds/female eighth segment sclerotized throughout ventrum. The arrangement of these folds is diagnostic but difficult to describe (e.g. Fig. 186).
19. Valve broad with ventroapical process/valva slender, digitate. In the out-groups that I have examined the valva is slender. The apomorphic state of this character is developed in the *leucomelanella*-group. This group is also defined by a close similarity in genitalia and in the biology. *C. schleichi* is regarded as the sister-group of the other species of the *leucomelanella*-group. Its elongated dorsoapical process of the valva is probably a further apomorphic state.
20. Culcitula large/culcitula small. The apomorphic state of this character has been observed in *leucomelanella* and *leucothoracellum*.
21. Transtilla well defined, circular/transtilla membranous. The apomorphic state of this character is a synapomorphy for the *leucomelanella*-group.
22. Transtilla a narrow band/transtilla membranous.
23. Sacculus broad, rhomboid-shaped; sacculus comparatively slender, digitate or knife-shaped.
24. Vinculum very short/vinculum moderately long.
25. Female eighth segment with pair of large, strongly sclerotized, ovate sclerotizations/female eighth segment evenly sclerotized. The apomorphic state of characters 22–25 is restricted to the *marmoreum*-group.
26. Uncus with transverse fold/uncus without fold.
27. Posterior margin of vinculum deeply emarginated lateromedially/posterior margin of vinculum almost straight. This is a further apomorphic state of character 5.
28. Posterior margin of vinculum with pair of long, needle-shaped medial processes/posterior margin of vinculum almost straight. This character is probably correlated with 27. The apomorphic state of characters 26–28 is a synapomorphy of the *stramentella*-group.
29. Ventral margin of tegumen with broad, almost triangular prolongation towards transtilla/ventral margin of tegumen slightly rounded.
30. Tegumen strongly narrowing medially/tegumen gradually narrowing towards uncus. This character is intermediate in two species of the *fraternella*-group but this is supposed to be a secondary reduction.
31. Pedunculi large/pedunculi small. The apomorphic state of characters 29–31 is expressed in division B of *Caryocolum* which is most probably a monophyletic entity.
32. Valve broad, spatula-shaped/valva slender, digitate.
33. Sacculus reduced/sacculus well developed. The sacculus is distinctly developed in the Gnorimoschemini I have examined. It is clearly fused with the valva in *confluens* and *fraternella*.
34. Uncus smooth/uncus granular. A granular or spinose uncus is widely distributed in the Gnorimoschemini.
35. Valva with apical brush of setae/setae distributed all over the valva but mainly distally. Species of the *fraternella*-group exhibit a tendency towards the apomorphic state.
36. Uncus long, narrow, slightly broadened medially/uncus short, gradually tapered.
37. Gnathos base large/gnathos base small.
38. Distal part of valva strongly bent ventrad/distal part of valva slightly curved. The apomor-

emargi	strame	protec	pullat	marmor	schlei	leucot	immixt	leucom	abhorr	simula	mucron	provin	fiorii	peregr	traun	caulig	sagine	inflat	sp. A	splend	majus	afghan	repent	petryi	ocular	amaure	mongol	paghma	tetram	vartia	longiu	nepale	sciure	bosale	vicine	viscar	alsine	tische	fische	Char
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	?	1	1	1	1	1	1	1	1	1	1	?	0	0	1	1	1	1	1	1	2
?	?	1	1	1	1	1	1	1	?	?	1	1	?	1	1	1	1	1	1	?	1	1	1	1	1	1	?	1	1	1	1	1	1	1	1	1	1	1	1	3
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0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	?	1	1	1	1	1	1	1	1	1	1	?	1	1	0	0	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	-	0	1	1	1	1	0	0	6
?	?	0	0	0	1	1	1	1	?	?	1	0	?	0	0	-	-	0	-	?	0	0	-	1	1	0	?	1	1	0	0	0	1	1	1	1	1	-	0	7
?	?	1	1	1	0	0	0	0	?	?	0	0	?	0	0	0	0	0	0	?	0	0	0	0	1	0	?	0	0	0	0	0	0	1	0	1	1	0	0	8
?	?	0	0	0	0	0	0	0	?	?	0	0	?	1	1	0	0	0	0	?	0	0	0	0	0	0	?	1	1	0	1	0	0	1	1	0	0	0	1	9
?	?	0	0	0	0	0	0	0	?	?	0	0	?	0	0	0	0	0	1	?	1	1	1	1	0	0	?	0	0	0	0	0	0	0	0	0	0	0	0	10
?	?	0	0	0	0	0	0	0	?	?	0	0	?	0	0	0	0	0	1	?	1	1	1	1	0	0	?	0	0	-	-	-	0	0	0	0	0	0	0	11
0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	?	0	0	0	1	1	0	0	0	1	1	?	-	-	0	0	0	0	0	0	0	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	1	1	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	13
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	-	1	1	?	0	0	0	0	0	0	0	0	0	14
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	?	0	0	0	1	1	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	15
0	0	0	0	0	1/0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
?	?	0	0	0	0	0	0	0	?	?	0	1	?	1	1	-	-	0	0	?	0	0	0	0	1	0	?	0	0	0	0	0	0	0	0	0	0	0	0	17
?	?	0	0	0	0	0	0	0	?	?	-	1	?	1	1	0	0	0	0	?	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	0	0	18
0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	19
0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	20
0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	21
0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	22
0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	23
0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	24
?	?	1	1	1	0	0	0	0	?	?	0	0	?	0	0	0	0	0	0	?	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	0	0	25
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	1	0	0	0	0	0	0	26
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	27
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	28

Table 2 Data-matrix of important phylogenetic characters for division A of *Caryocolum*. Numbers refer to characters explained in the text. 1 = character present (presumed apomorphy), 0 = character absent (presumed plesiomorphy or character-reversal), – = intermediate state, ? = character state unknown.

Characters	6	9	15	17	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
hispanicum	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
confluens	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fraternell	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
klosi	0	1	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
interalbic	0	1	1	0	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
laceratell	0	?	1	?	1	1	1	0	0	1	1	1	1	1	?	0	0	?	?	?	?	?	?	?	0	0
nearcticum	0	?	1	?	1	1	1	0	0	1	1	1	1	1	?	0	0	?	?	?	?	?	?	?	0	0
blandella	0	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0
blandelloi	0	0	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0
horoscopa	0	?	1	?	1	1	1	0	0	1	1	1	1	1	?	1	1	?	?	?	?	?	?	?	0	0
jaspidella	?	?	?	1	?	?	?	?	?	?	?	?	?	?	0	?	?	1	0	1	0	0	0	0	?	?
proximum	0	0	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0
blandulell	0	-	1	0	1	1	1	0	0	1	1	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0
tricolorel	1	0	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0
fibigerium	1	0	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0
junctella	0	0	1	0	1	1	1	0	0	1	1	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0
kasyi	0	?	1	?	1	1	1	0	0	1	1	1	1	1	?	0	0	?	?	?	?	?	?	?	0	0
extremum	0	0	1	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0
cassella	0	0	0	1	1	1	1	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
moehringia	0	1	1	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0
petrophilu	0	0	1	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0
huebneri	0	0	0	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1
kroesmanni	0	0	0	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	1	1	1

Table 3 Data-matrix of important phylogenetic characters for division B of *Caryocolum*. Numbers refer to characters explained in the text. 1 = character present (presumed apomorphy), 0 = character absent (presumed plesiomorphy or character-reversal), – = intermediate state, ? = character state unknown.

phic state of this character is expressed in the *interalbicella*-group and the *extremum*-group. The character state is difficult to decide in *kasyi* which could belong to a separate species-group. However, it was scored as apomorphic.

39. Female eighth segment with pair of rod-like dorsolateral sclerotizations/female eighth segment evenly sclerotized without rod-like sclerotizations. The apomorphic state of this character has been observed in *klosi* and *interalbicella*. The close similarity of *laceratella* and *nearcticum* in genitalia structures of the males indicate a close relationship of these species.

40. Saccus broad/saccus slender. This character has a further apomorphic state (see 48).

41. Valva with apical bulge/valva slender, digitate. The apomorphic state of this character is secondarily lost in *blandulella*. The development of a weak apical bulge in *junctella* is presumably a convergence.

42. Posterior part of ductus bursae with sclerotized plate/posterior part of ductus bursae without sclerotized plate. This character is difficult to observe and was recognized for some *Caryocolum* species close to *blandella*.

43. Female eighth segment with a pair of digitate dorsal processes/female eighth segment without processes.

44. Female eighth segment with a pair of digitate ventral processes/female eighth segment without processes.

45. Female eighth segment with numerous microtrichia ventromedially/female eighth segment without ventromedial microtrichia. The presumed apomorphic state of this character is considered to be a convergent development of some individual species and the *huebneri*-group.

46. Female eighth segment with a pair of dorsal flaps/female eighth segment without flaps.
47. Female eighth segment with a pair of ventral flaps/female eighth segment without flaps. The apomorphic state of this character is represented in the *huebneri*-group. It is secondarily lost in *kroesmanniella*.
48. Female eighth segment with a membranous ventral region/female eighth segment with a sclerotized ventral region.
49. Saccus extremely broad/saccus slender. The apomorphic state of this character is particularly expressed in *huebneri* and *kroesmanniella*.
50. Tegumen with a pair of long ventrolateral processes/tegumen without ventrolateral processes. The apomorphic state of this character is weakly developed in numerous species of division B of *Caryocolum*. However, it is only scored as apomorphic in *huebneri* and *kroesmanniella*.

CARYOCOLUM Gregor & Povolný, 1954

Caryocolum Gregor & Povolný, 1954: 87 [as subgenus of *Gnorimoschema* Busck, 1900]. Type species: *Gelechia leucomelanella* Zeller, 1839: 198, by original designation.
Caryocolum Gregor & Povolný; Gozmány, 1958: 198 [raised to genus].

Diagnosis. Head convex, without frontal processes or modifications. Ocellus present. Proboscis well developed, almost reaching length of labial palpus. Maxillary palpus consisting of four segments. Labial palpus recurved; first segment short; second segment slightly longer than third, with brush of raised scales below. Antenna without pecten on scape. Fore wing 3·5–8·5 mm. Ground colour, light to dark brown, occasionally black; mottled with grey, orange-brown, white; dorsum lighter; irregular light fasciae across wing at one-fifth and middle; white to light brown costal and tornal spots at four-fifths, sometimes confluent; dark brown spots near base, distad of cell, the latter usually comma-shaped; dark brown patch from fold across wing towards costa at one-quarter, frequently divided. Fore wing venation: *R*4 and *R*5 on long common stalk (Fig. 2); basal distance *R1–R2* slightly greater than *R2–R3*; *M*1–*M*3 and *Cu*1 separate; *M*3 and *Cu*1 separate or on short common stalk. Frenulum of female consisting of three long setae.

Genitalia ♂. Eighth tergite and sternite separated into free flaps; ventral membrane of eighth tergite with pair of anterolaterally inserted coremata, consisting of long hair-like scales; dorsal membrane of eighth sternite with or without elongated scales. Uncus broad to moderately narrow. Gnathos with broad base; pillow-like culcitula with numerous minute spines; without hook. Tegumen shallowly to deeply emarginated anteriorly. Transtilla sclerotized, with or without spines. Valva of variable shape, never reaching beyond uncus. Sacculus clearly separated or rarely fused with valva, usually shorter than valva. Posterior

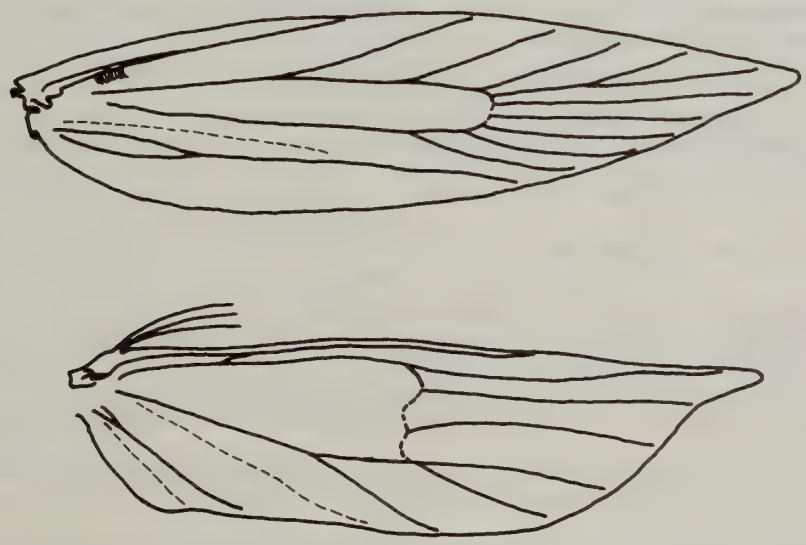


Fig. 2 *Caryocolum extremum* sp. n., ♀. Wing venation.

margin of vinculum with medial incision or emargination, frequently also emarginate lateromedially resulting in up to two pairs of processes. Saccus long, slender to extremely broad. Anellus membraneous, frequently with short peg-like to long needle-shaped sclerotizations. Aedeagus slender, base swollen; with or without minute cornuti at apex; two apical sclerotizations developed. Anterior part of ductus ejaculatorius with sclerotized lamina.

Genitalia ♀. Anterior margin of seventh segment without modifications. Papilla analis elongate; apophysis posterior 0·8–2·8 mm, apophysis anterior 0·20–0·75 mm. Eighth segment usually with sclerotized areas laterally, ventromedially; ventrolateral zone frequently with folds; posterior margin with long setae; drop-shaped, flap-like or digitate processes occasionally developed. Sclerotized antrum tubular to funnel-shaped, reaching up to end of apophysis anterior, sometimes reduced. Ductus bursae with pair of short to long lateral sclerotizations posteriorly which reach up to ductus seminalis, sometimes pair of additional sclerites present, rarely plate-like colliculum or spiny ring. Corpus bursae usually clearly defined, with or without microtrichia, exceptionally strongly sclerotized spinous area around signum. Signum always present; small to large base, strong hook, occasionally with few additional teeth; signum rarely reduced to sclerotized plate.

Remarks. The fore wing pattern of *Caryocolum* exhibits remarkable inter- and intraspecific variability. It is usually characterized by a moderately dark ground colour, a lighter dorsal margin and three light fasciae across the wing but the range of variation includes almost unicolorous specimens. It can therefore be difficult to recognize species of this genus on external characters alone.

The male eighth tergite is usually heavily sclerotized anteriorly whereas the medial zone is more membranous; additionally the anterior margin is distinctly emarginated. The coremata and particularly the elongated scales of the eighth sternite are readily lost during preparation of genitalia slides. The number of coremata varies between species, particularly of different species-groups. The male uncus usually lacks specialisations. Species of the *leucomelanella*-group are characterized by the development of a dorsomedial tooth; the uncus of the *stramentella*-group is slightly folded transversely. The gnathos varies in the shape of the base and in the size of the culcitula. A modified transtilla is characteristic for most of the *Caryocolum* species. It is either a sclerotized membrane or an elliptic structure with or without numerous spines. The valva is a structure of high diagnostic value. Its shape shows extraordinary variability between different species. The sacculus exhibits similar variation but frequently it is simple, knife-shaped. There appears to be some correlation between the length of the saccus and the aedeagus, similar to that in *Mirificarma* (Pitkin, 1984). A single, rod-like sclerotization is always developed along the left side of the aedeagus, whereas the dorsal part is membranous distally. Cornuti are present in division A of *Caryocolum* only. The vinculum shows remarkable variation in length and particularly in the development of the posterior margin, which is moderately complicated in division A with up to two pairs of processes. Most species of *Caryocolum* have a distinct signum hook which is only reduced in *moehringiae* and *kroesmanniella*. The shape and length of the signum is usually characteristic but should be studied in comparable positions. The female genitalia are less significant for determination than the males, although many distinctive structures have been found.

Biology. Host-plants: Caryophyllaceae (see pp. 443–444).

Distribution. The genus *Caryocolum* is distributed between 28° N and 68° N throughout the Palaearctic Region and is also represented by a small number of species in the Nearctic Region. Most of the species occur in mountainous areas.

Key to the species of *Caryocolum*

Males

(Males of *vartianorum*, species A and *jaspidella* are unknown.)

1 Posterior margin of vinculum with pair of extremely enlarged, almost rectangular projections (Fig. 104) ..... ***sciurella*** (p. 464)
– Posterior margin of vinculum without extremely enlarged, rectangular projections 2
2 Sacculus short semicircular; posterior margin of vinculum with deep rectangular emargination (Fig. 111) ..... ***oculatella*** (p. 470)
– Sacculus of various shape, never short semicircular, rounded; posterior margin of vinculum without deep rectangular emargination; if deeply emarginate, sacculus not semicircular (Fig. 161) 3
3 Uncus broad; tegumen comparatively small anteriorly, gradually narrowing towards uncus; pedunculi small; posterior margin of vinculum with medial incision or emargination and

occasionally indistinct lateromedial emargination (Figs 97, 98); aedeagus with minute cornuti (absent in *nepalense*, *longiusculum*) (Figs 97–103, 105–110, 112–139) 4

– Uncus narrow; tegumen very broad anteriorly, medial part strongly narrowing; pedunculi large; posterior margin of vinculum with deep, rarely reduced, medial incision, without lateromedial emargination; aedeagus without cornuti (Figs 140–161) 39

4 Aedeagus without cornuti; sacculus evenly tapered to a fine point (Figs 105, 106) 5

– Aedeagus with cornuti; sacculus various shape, if pointed apex, not evenly tapered 6

5 Saccus 3·0 times length of valva (Fig. 105) ..... ***nepalense*** (p. 465)

– Saccus 1·5 times length of valva (Fig. 106) ..... ***longiusculum*** (p. 466)

6 Transtilla with spines (Figs 112, 113, 117–119, 138, 139) 7

– Transtilla without spines 13

7 Posterior margin of vinculum with pair of long needle-shaped processes (Figs 138, 139) 8

– Posterior margin of vinculum without long needle-shaped processes (Figs 112, 113, 117–119) 9

8 Valva and sacculus slender (Fig. 138) ..... ***stramentella*** (p. 497)

– Valva and sacculus comparatively broad (Fig. 139) ..... ***emarginatum*** (p. 497)

9 Aedeagus S-curved (Figs 112, 113) 10

– Aedeagus almost straight (Figs 117–119) 11

10 Sacculus thumb-shaped, apex rounded (Fig. 112) ..... ***petryi*** (p. 471)

– Sacculus digitate, apex pointed (Fig. 113) ..... ***repentella*** (p. 473)

11 Aedeagus stout; head and thorax brown (Figs 36–38, 117) ..... ***inflativorella*** (p. 476)

– Aedeagus slender; head and thorax white (Figs 39–41, 118, 119) 12

12 Fore wing 4·5–5·0 mm, ground colour predominantly black (Figs 39, 40) ..... ***saginella*** (p. 477)

– Fore wing 5·0–6·0 mm, ground colour predominantly dark brown (Fig. 41) ..... ***cauligenella*** (p. 478)

13 Sacculus broad, rhomboid shape; valva shorter than sacculus (Figs 134–137) 14

– Sacculus comparatively slender, finger- to knife-shaped; valva longer than sacculus (Figs 97–103, 107–110, 114–116, 120–133) 16

14 Eighth tergite and tegumen deeply emarginated anteriorly (Fig. 5) ..... ***marmoreum*** (p. 491)

– Eighth tergite and tegumen slightly emarginated anteriorly (Fig. 5) 15

15 Fore wing clay-coloured, without distinct pattern (Fig. 67) ..... ***protectum*** (p. 496)

– Fore wing ground colour blackish, with distinct pattern (Figs 64–66) ..... ***pullatella*** (p. 495)

16 Valva broad, with two apical processes (Figs 130–133) ..... ***schleichi*** (p. 487)

– Valva moderately slender, without apical process (Figs 97–103, 107–110, 114–116, 120–129) 17

17 Valva gradually tapered distally 18

– Valva abruptly tapered distally (Figs 126–129) 36

18 Sacculus with hammer-shaped distal part (Figs 107, 108) 19

– Sacculus without hammer-shaped distal part 20

19 Valva and sacculus comparatively slender (Fig. 107) ..... ***tetrameris*** (p. 467)

– Valva and sacculus comparatively broad (Fig. 108) ..... ***paghmanum*** (p. 468)

20 Posterior margin of vinculum with deep U-shaped slightly asymmetrical emargination medially; annellus sclerotizations very long (Fig. 123) ..... ***provinciella*** (p. 481)

– Posterior margin of vinculum with medial incision; anellus sclerotizations absent to moderately long 21

21 Posterior margin of vinculum with broad lateral projection; anellus sclerotizations moderately long (Figs 99–103) 22

– Posterior margin of vinculum with indistinct lateral projection; anellus sclerotizations short or absent (Figs 97, 98, 109, 110, 114–116, 120–125) 25

22 Medial processes of vinculum reaching posterior margin (Figs 99–101) 23

– Medial processes of vinculum never reaching posterior margin (Figs 102, 103) 24

23 Fore wing 4·0–5·0 mm (Figs 8–10) ..... ***alsinella*** (p. 459)

– Fore wing 5·5–7·5 mm (Figs 11, 12) ..... ***viscariella*** (p. 461)

24 Posterior margin of vinculum with comparatively short lateral projection; frons dark silvery (Figs 13, 14, 102) ..... ***vicinella*** (p. 462)

– Posterior margin of vinculum with comparatively long lateral projection; frons light silvery (Figs 15, 103) ..... ***bosalella*** (p. 464)

25 Posterior margin of vinculum without pair of distinct medial processes (Figs 97, 98) 26

– Posterior margin of vinculum with pair of distinct medial processes (Figs 109, 110, 114–116, 120–122, 124, 125) 27

26 Posterior margin of vinculum with pair of finger-shaped lateral projections; fore wing: white basal and medial markings (Figs 7, 98) ..... ***tischeriella*** (p. 458)

– Posterior margin of vinculum with pair of indistinct lateral projections; fore wing: without white markings medially and basally (Figs 6, 97) ..... ***fischerella*** (p. 457)
27 Saccus almost 2·0 times length of distance from anterior margin of vinculum to apex of valva (Figs 124, 125) 28
– Saccus 1·2–1·5 times length of distance from anterior margin of vinculum to apex of valva (Figs 109–110, 114–116, 120–122) 29
28 Sacculus distinctly broader medially (Fig. 125) ..... ***simulans*** (p. 483)
– Sacculus gradually tapered (Fig. 124) ..... ***mucronatella*** (p. 482)
29 Sacculus with rounded apex (Figs 114–116) 30
– Sacculus with pointed apex (Figs 109, 110, 120–122) 32
30 Aedeagus: base with small process; valva slender, almost linear (Fig. 114) ..... ***afghanum*** (p. 473)
– Aedeagus: base without process; valva broad, if slender: slightly curved (Figs 115, 116) 31
31 Sacculus rounded distoventrally; valva broad, straight (Fig. 115) ..... ***majus*** (p. 474)
– Sacculus with distoventral emargination; valva slender, slightly curved at apex (Fig. 116) ***splendens*** (p. 475)
32 Valva broad thumb-shaped to linear, rounded apex (Figs 109, 110) 33
– Valve knife-shaped, tapered (Figs 120–122) 34
33 Valve broad thumb-shaped; posterior margin of vinculum with two pairs of long processes (Fig. 109) ..... ***mongolense*** (p. 469)
– Valva slender; posterior margin of vinculum with two pairs of short processes (Fig. 110) ***amaurella*** (p. 469)
34 Sacculus about twice as broad as valva, rounded towards pointed apex (Fig. 122) ..... ***fiorii*** (p. 480)
– Sacculus slightly broader than valva, slightly tapered towards apex (Fig. 120, 121) 35
35 Hind wing brown (Fig. 42) ..... ***trauniella*** (p. 479)
– Hind wing bright nacreous (Figs 43, 44) ..... ***peregrinella*** (p. 479)
36 Valva with short distordorsal hump; head and thorax white (Figs 53, 129) ***leucothoracellum*** (p. 486)
– Valva without distordorsal hump; head and thorax grey-brown to blackish, frons lighter (Figs 50–52, 126–128) 37
37 Posterior margin of vinculum with additional indistinct lateral projection (Fig. 126) ***abhorrens*** (p. 484)
– Posterior margin of vinculum without additional lateral projections (Figs 127, 128) 38
38 Valva with moderately long distal part; saccus 2·0–2·5 times length of vinculum (Fig. 127) ***leucomelanella*** (p. 484)
– Valva with moderately short distal part; saccus about 4·0 times length of vinculum (Fig. 128) ***immixtum*** (p. 486)
39 Valva extremely broad, spatula-shaped, with two apical humps (Figs 140–142) 40
– Valva comparatively slender, never spatula-shaped, without apical humps (Figs 143–161) 42
40 Sacculus separated from valva (Fig. 140) ..... ***hispanicum*** (p. 498)
– Sacculus fused with valva (Figs 141, 142) 41
41 Distal part of sacculus separated from valva (Fig. 141) ..... ***confluens*** (p. 498)
– Distal part of sacculus fused with valva (Fig. 142) ..... ***fraternella*** (p. 499)
42 Saccus extremely broadened, weakly tapered distally; tegumen with long lateral processes (Figs 160, 161) 43
– Saccus moderately slender; if broad, distinctly tapered distally; tegumen without or with short lateral processes (Figs 143–159) 44
43 Saccus with rounded distal part; posterior margin of vinculum with pair of rounded projections (Fig. 160) ..... ***huebneri*** (p. 516)
– Saccus rectangular; posterior margin of vinculum with pair of large triangular processes (Fig. 161) ..... ***kroesmanniella*** (p. 517)
44 Transtilla elliptical, without spines; vinculum long (Fig. 157) ..... ***cassella*** (p. 513)
– Transtilla never elliptical, with few to numerous spines; vinculum moderately short (Figs 143–156, 158, 159) 45
45 Sacculus sea-horse shaped (Fig. 156) ..... ***extremum*** (p. 512)
– Sacculus variously shaped, never sea-horse shaped 46
46 Posterior margin of vinculum with pair of pliers-shaped processes (Fig. 158) ... ***moehringiae*** (p. 514)
– Posterior margin of vinculum without pliers-shaped processes 47
47 Posterior margin of vinculum with deep V-shaped emargination (Figs 151, 159) 48
– Posterior margin of vinculum with short incision (Figs 143–150, 152–155) 49
48 Tegumen short without lateral processes; saccus comparatively slender (Fig. 151) ***blandulella*** (p. 508)

– Tegumen long with pair of lateral processes; saccus comparatively broad (Fig. 159) ***petrophilum*** (p. 515)
49 Sacculus with hook-shaped apex (Fig. 154) ..... ***junctella*** (p. 511)
– Sacculus knife-shaped 50
50 Valva with distinct apical bulge (Figs 147–150) 51
– Valva without apical bulge (Figs 143–146, 152, 153, 155) 54
51 Apical bulge of valva triangular (Fig. 148) ..... ***blandelloides*** (p. 505)
– Apical bulge of valva rounded 52
52 Valva moderately long, extending clearly beyond sacculus (Fig. 147) ..... ***blandella*** (p. 503)
– Valva moderately short, extending slightly beyond sacculus (Figs 149, 150) 53
53 Valva slightly narrowing medially (Fig. 149) ..... ***horoscopa*** (p. 505)
– Valva strongly narrowing medially (Fig. 150) ..... ***proximum*** (p. 507)
54 Valva abruptly tapered distally (Fig. 155) ..... ***kasyi*** (p. 512)
– Valva evenly tapered or occasionally slightly broadened distally (Figs 143–146, 152, 153) 55
55 Posterior margin of vinculum straight; thorax white (Figs 76, 145) ..... ***laceratella*** (p. 502)
– Posterior margin of vinculum with pair of indistinct medial projections; thorax dark brown to blackish 56
56 Valva slightly tapered distally (Figs 143, 144, 146) 57
– Valva slightly broadened distally (Figs 152, 153) 59
57 Valva short, extending slightly beyond sacculus (Fig. 146) ..... ***nearcticum*** (p. 503)
– Valva comparatively long, extending clearly beyond sacculus (Figs 143, 144) 58
58 Saccus and valva comparatively broad; head dark brown (Figs 73, 74, 143) ..... ***klosi*** (p. 500)
– Saccus and valva comparatively slender; head white (Figs 75, 144) ..... ***interalbicella*** (p. 501)
59 Posterior margin of vinculum with pair of lateral projections (Fig. 153) ..... ***fibigerium*** (p. 510)
– Posterior margin of vinculum without lateral projections (Fig. 152) ..... ***tricolorella*** (p. 509)

Females

(Females of *mongolense, splendens, fiorii, simulans, abhorrens, stramentella, emarginatum, nearcticum, horoscopa* and *kasyi* are unknown.)

1 Eighth segment with pair of drop-shaped ventral processes (Fig. 217) ..... ***cassella*** (p. 513)
– Eighth segment without drop-shaped ventral processes 2
2 Ductus bursae with long lateral sclerotizations posteriorly (Figs 163–202) 3
– Ductus bursae without or with tiny lateral sclerotizations posteriorly (Figs 203–216, 218–221) 35
3 Signum-hook with distinct additional teeth (Figs 169, 190) 4
– Signum-hook without distinct additional teeth 5
4 Signum-hook extremely enlarged; corpus bursae without spiny area around signum (Fig. 169) ***sciurella*** (p. 464)
– Signum-hook large; corpus bursae without spiny area around signum (Figs 189, 190) ***provinciella*** (p. 481)
5 Eighth segment with pair of large vaulted semiovate sclerotizations (Figs 200–202) 6
– Eighth segment without pair of large vaulted semiovate sclerotizations (Figs 163–168, 170–188, 191–199) 8
6 Fore wing clay-coloured, without distinct markings (Fig. 67) ..... ***protectum*** (p. 496)
– Fore wing with distinct markings, never clay-coloured (Figs 59–66) 7
7 Fore wing pattern usually variegated, brown ground colour (Figs 59–63) ..... ***marmoreum*** (p. 491)
– Fore wing pattern moderately unicolorous, blackish ground colour (Figs 64–66) ***pullatella*** (p. 495)
8 Signum with large slightly bent hook, reduced base (Fig. 163) ..... ***fischerella*** (p. 457)
– Signum with small to medium-sized hook (Figs 164–165, 170–185, 187, 191–199); if large, strongly bent with broad base (Figs 166–168, 186, 188) 9
9 Corpus bursae with numerous microtrichia; signum-hook large with broad base (Figs 165–168) 10
– Corpus bursae without or with scarcely discernible microtrichia; signum-hook small to medium-sized; if large, comparatively small base (Figs 164, 170–188, 191–199) 13
10 Antrum completely absent (Figs 165, 166) 11
– Antrum developed (Figs 167, 168) 12
11 Fore wing 4·0–5·0 mm (Figs 8–10) ..... ***alsinella*** (p. 459)
– Fore wing 5·5–6·5 mm (Figs 11, 12) ..... ***viscariella*** (p. 461)
12 Antrum a distinct funnel (Fig. 167) ..... ***vicinella*** (p. 462)
– Antrum indistinct, slightly developed (Fig. 168) ..... ***bosalella*** (p. 464)
13 Antrum large, funnel-shaped (Figs 164, 170–175, 178–183) 14

– Antrum small, short tube or ring-shaped, occasionally indented anteriorly (Figs 177, 184–187, 191–199) 26
14 Apophyses anteriores one-third length of eighth segment (Fig. 182) ..... species **A** (p. 475)
– Apophyses anteriores 0·8–2·0 times length of eighth segment 15
15 Antrum extended to about apices of apophyses anteriores (Fig. 179) ..... ***repentella*** (p. 473)
– Antrum shorter than apophyses anteriores 16
16 Antrum broad anteriorly (Figs 180, 181, 183) 17
– Antrum narrow anteriorly (Figs 164, 170–175, 178, 182) 19
17 Apophyses anteriores extended to about length of eighth segment (Fig. 180) ..... ***afghanum*** (p. 473)
– Apophyses anteriores 1·5–2·0 times length of eighth segment 18
18 Anterior margin of antrum indented (Fig. 181) ..... ***majus*** (p. 474)
– Anterior margin of antrum almost straight or slightly concave (Fig. 183) ..... ***inflativorella*** (p. 476)
19 Antrum with pair of distinct lateral folds (Fig. 164) ..... ***tischeriella*** (p. 458)
– Antrum without lateral folds 20
20 Lateral sclerotizations of ductus bursae extending to or beyond apices of apophyses anteriores (Figs 170, 172–173, 178) 21
– Lateral sclerotizations of ductus bursae not extending up to apices of apophyses anteriores (Figs 171, 174–175) 24
21 Eighth segment with two pairs of strong ventromedial folds (Fig. 178) ..... ***petryi*** (p. 471)
– Eighth segment with numerous indistinct ventromedial folds 22
22 Apophyses posteriores 2·0–2·6 mm; (Fig. 173) ..... ***tetrameris*** (p. 467)
– Apophyses posteriores 1·1–1·3 mm; (Figs 170, 172) 23
23 Antrum without emargination anteriorly; signum-hook almost straight (Fig. 170) ..... ***nepalense*** (p. 465)
– Antrum emarginated anteriorly; signum-hook bent (Fig. 172) ..... ***vartianorum*** (p. 467)
24 Apophyses posteriores 1·4 mm, about 4 times length of eighth segment (Fig. 175) ..... ***amaurella*** (p. 469)
– Apophyses posteriores 2·4 mm, about 6 times length of eighth segment 25
25 Signum-hook long, lanceolate apex (Fig. 171) ..... ***longiusculum*** (p. 466)
– Signum-hook short, pointed apex (Fig. 174) ..... ***paghmanum*** (p. 468)
26 Eighth segment with distinct ovate ventromedial sclerotization, extending to posterior margin of segment; (Fig. 177) ..... ***oculatella*** (p. 470)
– Eighth segment without or rarely with indistinct ventromedial sclerotization, exceptionally extending to posterior margin of segment (Figs 184–188, 191–199) 27
27 Lateral sclerotizations of ductus bursae dilated posteriorly; antrum very short, emarginated up to anterior margin of eighth segment (Figs 184, 185) 28
– Lateral sclerotizations of ductus bursae rod-like; antrum short ring-shaped, emargination not extended to anterior margin of eighth segment (Figs 186–188, 191–199) 29
28 Fore wing 4·0–5·0 mm, ground colour predominantly black (Figs 39, 40) ..... ***saginella*** (p. 477)
– Fore wing 4·5–6·0 mm, ground colour predominantly dark brown (Fig. 41) ..... ***cauligenella*** (p. 478)
29 Lateral sclerotizations of ductus bursae slightly longer than antrum; hook of signum large (Figs 186–188) 30
– Lateral sclerotizations of ductus bursae 2·5–4·0 times length of antrum; hook of signum small to medium-sized (Figs 191–199) 31
30 Lateral sclerotization of ductus bursae narrow rod-like; signum-hook very large, strongly bent (Fig. 186) ..... ***trauniella*** (p. 479)
– Lateral sclerotization of ductus bursae broad, serrated; signum-hook large, slightly bent (Figs 187, 188) ..... ***peregrinella*** (p. 480)
31 Ventromedial folds of eighth segment joining near posterior margin of segment (Figs 191, 192) ***mucronatella*** (p. 482)
– Ventromedial folds of eighth segment joining at about middle of segment (Figs 193–199) 32
32 Lateral sclerotizations of ductus bursae extending slightly beyond middle of apophyses anteriores; signum-hook small (Fig. 195) ..... ***leucothoracellum*** (p. 486)
– Lateral sclerotizations of ductus bursae extending to about apices of apophyses anteriores; signum-hook comparatively large (Figs 193, 194, 196–199) 33
33 Lateral sclerotizations of ductus bursae extending clearly beyond apices of apophyses anteriores (Fig. 194) ..... ***immixtum*** (p. 486)
– Lateral sclerotizations of ductus bursae extending up to apices of apophyses anteriores (Figs 193, 196–199) 34
34 Strong folds surrounding ostium bursae (Fig. 193) ..... ***leucomelanella*** (p. 484)
– Folds around ostium bursae weakly developed (Figs 196–199) ..... ***schleichi*** (p. 487)

35 Ductus bursae with spiny ring (Fig. 216) ..... ***extremum*** (p. 512)
– Ductus bursae without spiny ring 36
36 Eighth segment without processes or sclerotized rods (Figs 203–205) 37
– Eighth segment with processes or sclerotized rods (Figs 206–215, 218–221) 39
37 Antrum short, ring-shaped (Fig. 204) ..... ***confluens*** (p. 498)
– Antrum long, tubular (Figs 203, 205) 38
38 Signum-hook slender (Fig. 203) ..... ***hispanicum*** (p. 498)
– Signum-hook stout (Fig. 205) ..... ***fraternella*** (p. 499)
39 Eighth segment with pair of sclerotized dorsolateral rods (Figs 206, 207) 40
– Eighth segment without sclerotized dorsolateral rods (Figs 208–215, 218–221) 41
40 Antrum narrow, one-fifth length of apophyses anteriores; signum medium-sized (Fig. 207) ***interalbicella*** (p. 501)
– Antrum comparatively broad, about one-third length of apophyses anteriores; signum large (Fig. 206) ..... ***klosi*** (p. 500)
41 Signum-hook with additional teeth (Fig. 215) ..... ***junctella*** (p. 511)
– Signum hook without additional teeth 42
42 Eighth segment with pair of digitate processes (Figs 208–212) 43
– Eighth segment with pair of flap-like processes (Figs 213–214, 218–221) 47
43 Eighth segment with dorsolateral processes (Figs 208, 209) 44
– Eighth segment with ventrolateral processes (Figs 210–212) 45
44 Antrum moderately long; processes of eighth segment with comparatively broad base (Fig. 208) ..... ***blandella*** (p. 503)
– Antrum moderately short; processes of eighth segment with comparatively narrow base (Fig. 209) ..... ***blandelloides*** (p. 505)
45 Eighth segment with membranous ventromedial zone (Fig. 211) ..... ***blandulella*** (p. 508)
– Eighth segment with strongly sclerotized, ovate ventromedial zone (Figs 210, 212) 46
46 Signum a stout hook (Fig. 210) ..... ***jaspidella*** (p. 506)
– Signum a slender hook (Fig. 212) ..... ***proximum*** (p. 507)
47 Eighth segment with dorsolateral flaps (Figs 213–214, 221) 48
– Eighth segment with ventrolateral flaps (Figs 218–220) 50
48 Signum a small plate, without hook (Fig. 221) ..... ***kroesmanniella*** (p. 517)
– Signum with hook (Figs 213–214) 49
49 Antrum one-third breadth of eighth segment (Fig. 213) ..... ***tricolorella*** (p. 509)
– Antrum half breadth of eighth segment (Fig. 214) ..... ***fibigerium*** (p. 510)
50 Signum a plate, without hook (Fig. 218) ..... ***moehringiae*** (p. 514)
– Signum with well-developed hook (Figs 219, 220) 51
51 Antrum longer than eighth segment (Fig. 219) ..... ***petrophilum*** (p. 515)
– Antrum shorter than eighth segment (Fig. 220) ..... ***huebneri*** (p. 516)

The *fischerella*-group

Characters as described under *fischerella*.

Caryocolum fischerella (Treitschke, 1833)

(Figs 6, 97, 163)

Lita fischerella Treitschke, 1833: 84. Type(s), GERMANY (EAST): Dresden (*Tischer*) [not traced].
Lita fischerella Treitschke; Fischer von Röslerstamm, 1834: 8, pl. 5, figs a–k.
Gelechia fischerella (Treitschke) Herrich-Schäffer, 1853: 183; Stainton, 1867: 132, pl. 11, fig. 2.
Phthorimaea fischerella (Treitschke) Meyrick, 1925: 96; Gaede, 1937: 258; Svensson, 1978: 93.
Gnorimoschema fischerellum (Treitschke) Klimesch, 1953: 315, figs 38, 39.
Caryocolum fischerellum (Treitschke) Gozmány, 1958: 203; Hartig, 1964: 42.
*Caryocolum fischeriell*a (Treitschke); Steuer, 1984: 135. [Incorrect subsequent spelling of *fischerella* Treitschke.]

ADULT (Fig. 6). ♂, ♀, 5·0–6·5 mm. Vertex grey, frons whitish. Second segment of labial palpus dark brown on outer surface, inner surface whitish; third segment blackish; second and third segments with whitish apex. Thorax and tegula greyish. Fore wing mid-brown mottled with orange-brown, light orange-brown along costa; small black spots at base of costa and on dorsal margin; irregular black stripe along fold, usually separated by orange-brown transverse fascia. White costal and tornal spots separate.

GENITALIA ♂ (Fig. 97). Transtilla broad band, without spines. Valva long, digitate, slightly tapered towards curved apex. Sacculus short, moderately broad, pointed. Vinculum broad; posterior margin slightly incised medially; pair of low projections laterally. Saccus stumpy, apically often with transverse sclerite. Aedeagus short, slender, few minute cornuti present.

GENITALIA ♀ (Fig. 163). Eighth segment without process. Antrum short, funnel-shaped, with pair of lateral folds. Short lateral sclerites of ductus bursae separated from antrum. Signum with reduced base, hook extremely enlarged with slightly bent apex.

REMARKS. *C. fischerella* is distinguished from all other *Caryocolum* by the colour and markings of the fore wing. In the genitalia it is similar to *tischeriella* although there are considerable differences in the shape of the valva, sacculus and antrum. The signum is unique within the genus because of its reduced base and the distinctly enlarged hook.

L. fischerella was described from an unspecified number of specimens collected near Dresden (East Germany) by von Tischer. The type-specimens have not been traced.

BIOLOGY. Host-plants: *Saponaria officinalis* L. (Treitschke, 1833: 85); *S. ocymoides* L. (Klimesch, 1953: 315).

A record of *Silene bellidifolia* Juss. ex Jacq. (‘*Lychnis vespertina*’) (Klimesch, 1953: 315) is dubious. Klimesch (loc. cit.) attributes this record to Cleu but I have not been able to trace this reference.

The gregarious larvae feed in May within spun terminal shoots and pupate in a web between the leaves (Treitschke, 1833: 85). Moths have been bred from the middle of June to late July.

DISTRIBUTION. West Germany, East Germany, Poland, Austria, Czechoslovakia, Bulgaria, U.S.S.R. (Latviya).

Additional records. Sweden (Svensson, 1978: 93); Finland (Jalava, 1977: 15); Denmark (Jensen, 1973: 142); France (Lhomme, [1946]: 629); Italy (Hartig, 1964: 42); Hungary (Gozmány, 1958: 203); Yugoslavia (Rebel, 1904: 351).

MATERIAL EXAMINED (including 4 ♂, 2 ♀ genitalia preparations)

Germany (West): 1 ♂, 1 ♀, Württemberg, Marbach/Neckar, e.l. 19.vi.1954 (*Saponaria officinalis*) (*Süssner*) (TLMF); 3 ♂, 3 ♀, Stassfurt, e.q. 26–27.vi.1954, e.l. 24.vii.1962 (*Soffner*); 2 ♂, 5 ♀, Regensburg, e.l. 9–17.vii.1927, e.l. 16–24.vii.1929 (*Saponaria officinalis*) (BMNH). **Germany (East)**: 1 ♂, 1 ♀, Brandenburg, Potsdam (*Hinneberg*); 1 ♀, Central Germany (BMNH). **Poland**: 1 ♀, Silesia; 1 ♀, Wrozlaw (‘Breslau’) (*Wocke*); 6 ♂, 10 ♀, Miedzyrzecsz (‘Meseritz’), e.l. 27.vi.–9.vii.1861, e.l. 30.vi.–2.vii.1866, e.l. 26.vi.1867 (*Saponaria*) (*Zeller*) (BMNH). **Austria**: 1 ♂, Steyr, e.l. 16.iv.[?]; 2 ♂, 2 ♀ (BMNH). **Czechoslovakia**: 6 ♂, 9 ♀, Bohemia, Trutnov (‘Trautenau’), e.l. 23–28.vi.1936 (*Soffner*); 6 ♂, 6 ♀, Bohemia e.l. 28.vi.–4.vii.1936 (*Fassnidge*) (BMNH). **Bulgaria**: 2 ♂, 1 ♀, Sofiya (‘Sofia’), e.l. 12.vi.1968 (*Saponaria*) (*Popov*) (BMNH). **U.S.S.R.**: 1 ♀, Latviya S.S.R. (‘Livon’) (BMNH).

The *tischeriella*-group

Characters as described under *tischeriella*.

Caryocolum tischeriella (Zeller, 1839)

(Figs 7, 98, 164)

Gelechia tischeriella Zeller, 1839: 11. LECTOTYPE ♂, GERMANY (EAST) (BMNH), here designated [examined].
Gelechia tischeriella Zeller; Herrich-Schäffer, 1854: 186, pl. 64, fig. 472.
Lita tischeriella (Zeller) Heinemann, 1870: 270; Thomann, 1929: 191, pl. 7, figs 8, 9; Benander, 1941: 43, fig. 3a.
Phthorimaea tischeriella (Zeller) Meyrick, 1925: 96; Gaede, 1937: 289.
Gnorimoschema tischeriellum (Zeller) Klimesch, 1953: 314, figs 36, 37.
Caryocolum tischeriellum (Zeller) Gozmány, 1958: 204; Hartig, 1964: 41.
Caryocolum tischeriella (Zeller); Steuer, 1984: 135.

ADULT (Fig. 7). ♂, ♀, 5·0–6·0 mm. Head dark grey, shiny at vertex; frons white. Labial palpus dark brown; second segment white dorsally at apex. Thorax and tegula orange-brown, base dark brown. Fore wing blackish brown with distinct white markings: small stripe from fold to costa at one-fifth, sometimes separate spot in fold; medial spot; dorsal margin grey-brown. White costal and tornal spots usually separate.

GENITALIA ♂ (Fig. 98). Valva broad at base, abruptly tapered to long digitate process, apex curved. Sacculus medially broad, distal part pointed. Vinculum broad; posterior margin slightly incised medially; lateral pair of projections present. Saccus long, small. Aedeagus long, slender, slightly curved, with numerous minute cornuti at apex.

GENITALIA ♀ (Fig. 164). Eighth segment without process; pair of narrow lateroventral folds. Antrum short, funnel-shaped, distally fused with pair of long lateral sclerotizations of ductus bursae, reaching apex of apophysis anterior. Signum with moderately large hook.

REMARKS. *C. tischeriella* is easily recognizable externally by the characteristically distinct white markings on a blackish ground-colour. The genitalia somewhat resemble those of *vicinella* and *fischerella* but differ in the male genitalia in the shape of the valva and sacculus and in the female genitalia in the folds of the eighth segment, the shape of the signum and the short apophyses anteriores and posteriores.

G. tischeriella was described from 3 ♂, 3 ♀ collected around Dresden (East Germany). Of the original series of 1 ♂, 2 ♀ I have examined the single male, already labelled 'lectotype' by Sattler, is here designated as lectotype. Zeller attributed the name *tischeriella* to 'FR' although Fischer von Röslerstamm never published this name. Therefore Zeller should be considered as author of this species.

BIOLOGY. Host-plant: *Silene nutans* L. (Schmid, 1887: 132). According to Wörz (1954: 130) the larvae overwinter; thus they may be found from early May to late June between two spun leaves, eating the inner surface (Schmid, 1887: 132; Benander, 1965: 18). Pupation takes place on the ground, the moths occurring from mid-June to late August. One specimen collected on the 5th May is probably mislabelled (coll. Derra, Bamberg).

DISTRIBUTION. France, West Germany, East Germany, Switzerland, Austria, Italy, U.S.S.R. (Latviya).

Additional records. Norway, Sweden (Klimesch, 1953: 314); Finland (Jalava, 1977: 15); Czechoslovakia (Hrubý, 1964: 299); Hungary (Klimesch, 1953: 314); Yugoslavia (Rebel, 1931: 147).

MATERIAL EXAMINED (including 5 ♂, 2 ♀ genitalia preparations)

Lectotype ♂, **Germany (East)**: [Dresden] (*Zeller*) (BMNH).

France: 3 ♂, Paris, 1900 (*Lhotte*); 3 ♂, 4 ♀, Paris, larvae on tips of *Silene nutans*, moths emerged 1879, 6.vii.1884 (*Ragonot*) (BMNH). **Germany (West)**: 1 ♂, [Mainz] Mombach (BMNH); 1 ♂, Unnersdorf, Umg. Staffelstein, 6.v.1979 (*Hacker*) (coll. Derra, Bamberg). **Germany (East)**: 2 ♀ (paralectotypes), [Dresden] (*Zeller*); 10 ♂, 10 ♀, Jena (*Schläger*); 1 ♀, Central Germany; 1 ♂ Nordthüringen, larva on *Silene nutans*, moth emerged 25.vi. (all BMNH). **Switzerland**: 2 ♂, 2 ♀, Zürich (*Frey*) (BMNH); 1 ♀, Wallis, Pfynwald, 590 m, 8.vii.1980 (*Whitebread*); 1 ♂, Biel, Cornaux, 490 m, 4.viii.1985 (*Bryner*) (coll. Whitebread, Magden). **Austria**: 2 ♂, Tirol ('Teriol sept.'), Umhausen, e.l. 26.vi.1945 (*Silene nutans*) (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 2 ♂, Südtirol, Schnalstal, 800 m, E. viii.1967, E. viii.1974 (*Zürnbauer*) (TLMF). **U.S.S.R.**: 1 ♀, Latviya S.S.R. (*Tischer*) (BMNH). No locality data: 9 ♂, 8 ♀.

The *alsinella*-group

GENITALIA ♂. Uncus broad. Transtilla weakly developed, without spines. Valva long, slender, digitate, apex slightly curved. Sacculus of variable length, thumb-shaped. Posterior margin of vinculum with deep medial and pair of shallow lateromedial incisions resulting in medial pair of large, digitate processes, sometimes lateral projection developed. Saccus long, slender. Anellus with pair of long, needle-shaped sclerotizations. Aedeagus slender with numerous minute cornuti apically.

GENITALIA ♀. Eighth segment without process; with distinct, short ventromedial folds. Antrum small to absent. Ductus bursae with pair of long lateral sclerotizations. Inner surface of corpus bursae with numerous microtrichia. Signum with large, stout, strongly bent hook.

BIOLOGY. Host-plants: Paronychioideae (*Spergularia*); Alsinoideae (*Minuartia, Stellaria, Cerastium*); Silenoideae (*Lychnis, Silene, Petrorhagia*).

Caryocolum alsinella (Zeller, 1868).

(Figs 8–10, 99, 165)

Gelechia alsinella Zeller, 1868*a*: 145. LECTOTYPE ♂, ITALY: Raibl (BMNH), here designated [examined].

[*Gelechia maculiferella* (Douglas); Stainton, 1867: 154, pl. 12, fig. 1. Misidentification.]

Lita albifrontella Heinemann, 1870: 266. Type(s), AUSTRIA: near Wien, vii [not traced]. [Synonymized by Rebel, 1901: 149.]

Lita alsinella (Zeller) Heinemann, 1870: 266.
Lita tristella Heinemann, 1870: 267. Holotype, SWITZERLAND: Ober-Engadin, vii [not traced]. [Synonymized by Rebel, 1901: 149.]
Lita semidecandriella Tutt, 1887*a*: 29. Syntypes, GREAT BRITAIN: England [not traced]. [Synonymized by Karsholt, 1981: 260.]
Gelechia semidecandrella Threlfall & Stainton, 1887: 233. LECTOTYPE ♂, GREAT BRITAIN: England (BMNH), here designated [examined].
Lita semidecandrella (Threlfall & Stainton); Rebel, 1901: 148; Benander, 1941: 42, fig. 2f.
Phthorimaea alsinella (Zeller) Meyrick, 1925: 96.
Phthorimaea semidecandrella (Threlfall & Stainton) Meyrick, 1925: 96.
Gnorimoschema alsinellum alsinellum (Zeller) Klimesch, 1954: 274, fig. 2.
Gnorimoschema alsinellum semidecandrellum (Threlfall & Stainton) Klimesch, 1954: 274, figs 3, 4.
Caryocolum alsinellum (Zeller) Gozmány, 1958: 207.
Caryocolum albifrontellum (Heinemann) Hartig, 1964: 41.
Caryocolum alsinella (Zeller); Karsholt, 1981: 260, figs 7, 8, 21, 22, 29.

ADULT (Figs 8–10). ♂, ♀, 4·0–5·0 mm. Head mid-brown; frons whitish. Second segment of labial palpus whitish, mottled with mid-brown on outer surface; third segment blackish, flecked with white dorsally. Thorax and tegula mid-brown speckled whitish. Fore wing mid-brown, speckled with white, particularly across one-fifth and middle. Indistinct black markings: patch from fold to costa at one-quarter; spots costad of cell at one-half and three-fifths, latter frequently extended towards tornus; markings often lined with orange-brown; apex mottled with black. White costal and tornal spots separate.

GENITALIA ♂ (Fig. 99). Sacculus thumb-shaped, short, distoventral margin slightly concave. Posterior margin of vinculum slightly projected laterally; pair of long, digitate medial processes reaching about posterior margin. Aedeagus straight, swollen base with tiny lateral process.

GENITALIA ♀ (Fig. 165). Eighth segment with four short folds surrounding ostium bursae. Antrum completely absent. Ductus bursae with pair of narrow to moderately broad lateral sclerites, reaching beyond middle to almost apex of apophysis anterior. Signum with small base.

REMARKS. The fore wing pattern of *alsinella* varies in the extent of the black markings and in the orange-brown scales. Specimens from Britain (Figs 9, 10) and Denmark (western Jutland) have more orange-brown scales and were therefore treated as a distinct subspecies (Klimesch, 1954: 274). However, specimens of similar external appearance also occur in southern Europe and it is unsatisfactory to treat this form as a subspecies.

The female genitalia of *alsinella* vary within the same population in the length and breadth of the lateral sclerotizations of the ductus bursae.

C. alsinella is very similar externally to *proximum*, *blandulella* and small specimens of *viscariella*. It usually differs from *blandulella* in the separate costal and tornal spots and from *proximum* in the less contrasting black patch at one-quarter. In genital characters it is easily distinguished from both *proximum* and *blandulella*. Adults of *alsinella* are smaller on average than those of *viscariella*, furthermore they usually lack orange-brown patches near the dorsum. The genitalia are almost indistinguishable from those of *viscariella*, but show slight differences in the narrower shape of the valva and the more indistinct basal process of the aedeagus. It is therefore possible that *alsinella* and *viscariella* are conspecific. However, the host-plants are different and the larvae are said to differ: Stainton (1867) illustrates the larva of *viscariella* as green whereas his *alsinella* [as *maculiferella*] is yellow; according to Zeller (1868*a*: 146) the larva of *alsinella* is light green and Benander (1965: 17) describes the colour [*semidecandrella*] as yellow or green. I tentatively regard *alsinella* and *viscariella* as good species until closer examination of larval material resolves the alleged differences.

G. alsinella was described from an unspecified number of specimens collected near Raibl. I have examined 4 ♂, 7 ♀ of the original series; a male, already labelled 'lectotype' by Sattler, is here designated as such.

L. albifrontella was described from an unspecified number of specimens collected near Vienna. The single type specimen of *L. tristella* was caught in Switzerland. The type-material of both species has not been traced and their real identity still remains doubtful. As Heinemann compared both *albifrontella* and *tristella* with *alsinella* it seems most appropriate to accept their synonymy with *alsinella*.

L. semidecandriella was described by Tutt from an unspecified number of specimens. The description was published in February [probably 25th] 1887 whereas that of *L. semidecandrella* Threlfall & Stainton appeared on March [3rd] 1887. I could not find any authentic material of *semidecandriella*; 3 ♂, 7 ♀ syntypes of *semidecandrella* have been examined and a male is here designated lectotype.

BIOLOGY. Host-plants: *Cerastium arvense* L. (coll. Schleich); *C. semidecandrum* L. (Stainton, 1867: 154); *Minuartia verna* (L.) Hiern ('*Alsine verna* var. *alpestris*') (Zeller, 1868*a*: 146).

In spring the larva is a leaf-miner (Sønderup, 1949: 106), later feeding on young shoots, flowers and seed-capsules which are spun together (Stainton, 1867: 154). Pupation takes place up to the end of June and moths occur from later June to late September. This species has been collected particularly along sandy coasts and on scree up to an altitude of 2700 m.

DISTRIBUTION. Spain, Great Britain, Netherlands, West Germany, Poland, Austria, Italy, Yugoslavia, Greece, U.S.S.R., Morocco.

Additional records. Belgium (Lhomme, [1946]: 627); Denmark, Sweden, Czechoslovakia (Karsholt, 1981: 261); Hungary (Klimesch, 1954: 274).

MATERIAL EXAMINED (including 9 ♂, 7 ♀ genitalia preparations)

Lectotype ♂ (*alsinella*), **Italy**: [Friuli, Raibl] (*Zeller*) (genitalia slide no. 2769; BMNH). Lectotype ♂ (*semidecandrella*), **Great Britain**: England, [Lancashire,] Lytham St Annes (larva on *Cerastium*, sand-cocoon) (*Threlfall*) (BMNH).

Spain: 3 ♂, Granada, Sierra Nevada, Road to Veleta, 2000–2300 m, 19–23.vii.1962 (*Sattler*); 1 ♀, Sierra Nevada, 1000 m, Puerto de la Ragua, 1000 m, 1.vii.1969 (*Sattler & Carter*) (BMNH). **Great Britain**: 2 ♂, 7 ♀ (*semidecandrella* paralectotypes), England, Lytham (*Cerastium*, sand cocoons) (*Threlfall*); 3 ♀, Deal, 1887 (*Threlfall*); 2 ♂, 4 ♀, Preston (*Threlfall*); 2 ♂, Dorset, Chesil Beach, e.l. 4–8.vii.1890 (*Ford*); 8 ♂, 6 ♀, Norfolk, Merton, 29.vii.1886, e.l. 28.vii.–10.viii.1891, e.l. 14–16.vii.1893 (*Walsingham*) (BMNH). **Netherlands**: 1 ♂, 3 ♀, Zandvoort, 6.viii.1936, 3–7.vii.1937 (*Doets; Bentinck*) (coll. Burmann, Innsbruck; BMNH). **France**: Le Touquet, 25.vii.1954 (*Jacobs*) (BMNH). **Germany (West)**: 2 ♂, Frankfurt, e.l. 26.vi.1865 (*Cerastium semidecandrum*) (*Schmid*) (BMNH). **Poland**: 1 ♂, 2 ♀, Szczecin ('Stettin'), e.l. (*Cerastium arvense*) (*Schleich*). **Austria**: 1 ♂, Nieder-Österreich, Theresienfeld, 25.viii.1964 (*Glaser*); 2 ♂, Nieder-Österreich, Oberweiden, 26.viii.1964 (*Glaser*) (BMNH). **Italy**: 3 ♂, 7 ♀ (*alsinella* paralectotypes), [Friuli,] Raibl, e.l. 1867 (*Zeller*); 2 ♀, Raibl (BMNH). **Yugoslavia**: 1 ♀, Dalmatia, Mlini, 13.ix.1961 (coll. Burmann, Innsbruck). **Greece**: 1 ♂, Fthiotis, Thermopylae at Lamia, 2 m, 25.ix.1984 (*Fibiger*). **U.S.S.R.**: Yevreysk A. O., Radde ('Radefka'), 29–31.vii.1876 (*Christoph*). **Morocco**: 1 ♂, Haut Atlas, Oukaïmedene, 2400–2700 m, 5–21.vii.1972 (*Friedel*) (coll. Burmann, Innsbruck).

Caryocolum viscariella (Stainton, 1855)

(Figs 11, 12, 100, 101, 165)

Gelechia viscariella Stainton, 1855: 43. Syntypes, GREAT BRITAIN: e.l. (larvae on *Lychnis viscaria*) (*Logan*) (?BMNH) [not traced].

Gelechia albifaciella Heinemann, 1870: 205. Holotype ♂, GERMANY (WEST) (BMNH) [examined]. **Syn. n.**

Gelechia albifasciella Heinemann; Wocke, 1871: 143. [Incorrect subsequent spelling of *albifaciella* Heinemann.]

Lita behenella Constant, 1890*a*: 125, pl. 1, fig. 3. LECTOTYPE ♂, FRANCE (MNHN), designated by Povolný (1983: 174, pl. 1, fig. 1; fig. 10, as 'holotype') [examined]. [Synonymized with *albifaciella* by Sattler, 1964: 156.] **Syn. n.**

Lita viscariella (Stainton) Rebel, 1901: 148.

Phthorimaea behenella (Constant) Meyrick, 1925: 95.

Phthorimaea viscariella (Stainton) Meyrick, 1925: 95.

Gnorimoschema behenellum (Constant) Klimesch, 1953: 281, figs 30, 31.

Caryocolum behenellum (Constant) Gozmány, 1958: 200; Povolný, 1983: 174.

Caryocolum viscariellum (Stainton) Gozmány, 1958: 200.

Caryocolum albifaciella (Heinemann) Sattler, 1964: 156.

ADULT (Figs 11, 12). ♂, 5·5–7·5 mm, ♀, 5·5–6·5 mm. Head mid- to dark brown; frons whitish. Second segment of labial palpus whitish, mottled with dark brown on outer surface; third segment blackish, flecked with white dorsally. Thorax and tegula dark brown, mottled with light brown and orange-brown. Fore wing dark brown mottled with light brown; indistinct black markings costad of fold at one-quarter, costad of cell at one-half and three-fifths. Sometimes large orange-brown patches from fold towards costa at one-fifth and middle. White costal and tornal spots usually separated by orange-brown streak.

GENITALIA ♂ (Figs 100, 101). As described under *alsinella*. Aedeagus with distinct lateral process.

GENITALIA ♀ (Fig. 166). As described under *alsinella*.

REMARKS. The fore wing colour of *viscariella* varies from moderately light to almost unicolorous dark

brown, thus some specimens of *viscariella* resemble *vicinella*, *petryi* and *inflativorella* externally. Small specimens are also very similar to *alsinella* although they usually differ in the two orange-brown patches. *C. viscariella* differs from the three first-mentioned species in many genital characters. It can hardly be distinguished from *alsinella* in the genitalia which show some slight differences such as the slightly broader valva and the more distinct lateral process of the aedeagus. However, it is possible that *viscariella* and *alsinella* are conspecific (see also Remarks for *alsinella*). Alpine specimens from *Silene vulgaris* ('*behenella*') are usually darkened and less variegated, furthermore, the process of the aedeagus is almost reduced; however, it seems unsatisfactory to treat them as a separate species.

G. viscariella was described from an unspecified number of specimens bred from '*Lychnis viscaria*' by Logan. No original material has been found in the BMNH.

G. albifaciella was described from a single male bred from an unidentified plant near Regensburg. The holotype is labelled 'Oberaudorf' and the discrepancy in the type-locality is discussed in detail by Sattler (1964: 156).

L. behenella was described from an unspecified number of specimens collected during August in France. Later, Constant (1890*b*: 6) stated that he described it from 6 syntypes.

Biology. Host-plants: *Silene dioica* (L.) Clariv., *S. alba* (Miller) E. H. L. Krause, *Lychnis viscaria* L. (Bradford, [1979]: 128); *Silene vulgaris* (Moench) Garcke, *Cucubalus baccifer* (Lhomme, [1946]: 628).

Lhomme ([1946]: 625) records '*Lychnis vespertina*' (? = *Silene bellidifolia* Juss. ex. Jacy.) as a host-plant.

The larva occurs in May, feeding between spun leaves and boring into the stem which becomes swollen (pers. obs.). According to Bradford ([1979]: 128) the larvae feed from April to June. Moths have been collected from the middle of June to the middle of August.

Distribution. France, Great Britain, Denmark, Norway, Finland, East Germany, Switzerland, Austria, Hungary, Italy.

Additional records. Spain (Agenjo, 1968: [6]); Sweden (Hackman, 1950: 19).

A record from Poland (Schille, 1931: 174) as *Gelechia albifaciella* Heinemann needs confirmation.

Material examined (including 12 ♂, 8 ♀ genitalia preparations)

Holotype ♂ (*albifaciella*), **Germany (West)**: Oberaudorf, e.l. 5.vii.1863 (*Hofmann*) (BMNH). Lectotype ♂ (*behenella*), **France**: [Alpes de Dauphine] (genitalia slide Povolný; MNHN).

France: 2 ♀, La Grave, vii.1898 (*Chrétien*) (BMNH). **Great Britain**: 1 ♂, 3 ♀, England, 1870 (*Sang*); 1 ♂, e.l. Scarborough (*Lychnis dioica*) (*Stainton*); 1 ♂, Isles of Scilly, Tresco, 8–15.vii.1959 (*Bradley*) (BMNH); 1 ♂, 2 ♀, Dorset, Abbotsbury, Chesil Beach, e.l. 30.vi.1986 (larvae 23.v. *Silene dioica*) (*Huemer*); 2 ♀, Essex, Belhus Park Estates, Running Water Wood, e.l. 26.vi.1986 (larvae 21.v. *Silene dioica*) (*Huemer*) (coll. Huemer, Innsbruck). **Denmark**: 1 ♂, EJ, Lounkcov Skou, e.l. 18.vi.1980 (*Melandrium rubrum*) (*Karsholt*) (ZM). **Norway**: 1 ♂, On, Vinstra, 19–29.vii.1983 (*Karsholt*). **Finland**: 1 ♂, V Korpo ('Korppoo'), 15.viii.1969 (*Teriaho*); 1 ♂, V Pargas ('Parainen'), 23–24.vii.1972 (*Teriaho*); 1 ♂, Ekenas, 3.vii.1953 (*v.Schantz*) (ZM). **Germany (East)**: 1 ♂, Bad Blankenburg, Schwarzatal, 20.viii.1984 (*Steuer*) (coll. Steuer, Bad Blankenburg). **Switzerland**: 1 ♂, [Graubünden'] Bergün, 2.vii.1916 (*Thomann*) (coll. Burmann, Innsbruck); 1 ♀, Graubünden, Motta Naluns, 2140 m, e.l. 22.vii.1985 (larva 3.vii. on ?*Stellaria uliginosa* (Whitebread) (coll. Whitebread, Magden). **Austria**: 2 ♀, Tirol, Vennatal, 1500–1600 m, e.l. 5.viii.1943, e.l. 14.vii.1959 (*Silene inflata*) (*Burmann*) (coll. Burmann, Innsbruck). **Hungary**: 1 ♂, 1 ♀ (*Staudinger*) (BMNH); 1 ♂, Budapest (ZM). **Italy**: 1 ♂, Südtirol, Naturns, 660 m, M.vi.1966 (*Zürnbauer*) (TLMF); 4 ♂, 2 ♀, Lucania, Monte Vulture, dint. Laghi di Monticchio, 750 m, e.l. M.vi.1967 (*Melandrium album*) (*Hartig*) (coll. Burmann, Innsbruck; Pröse, Hof/Saale).

Caryocolum vicinella (Douglas, 1851).

(Figs 13, 14, 102, 167)

Gelechia vicinella Douglas, 1851: 102. Lectotype ♀, Ireland (BMNH), designated by Sattler (1964: 157) [examined].

[*Gelechia leucomelanella* Zeller; Stainton, 1867: 61, pl. 9, fig. 1. Misidentification.]

Lita vicinella (Douglas) Heinemann, 1870: 265; Benander, 1928: 80, pl. 6, fig. 43.

Lita inflatella Chrétien, 1901: 17. LECTOTYPE ♀, France (MNHN), here designated [examined]. [Synonymized by Klimesch, 1953: 311.]

[*Gelechia leucomelanella* ab. *albescens* Bankes, 1909: 265. Unavailable, infrasubspecific name. Misidentification.]

[*Gelechia leucomelanella* ab. *suffusa* Bankes, 1909: 265. Unavailable, infrasubspecific name. Misidentification.]

Phthorimaea inflatella (Chrétien) Meyrick, 1925: 96.
Phthorimaea vicinella (Douglas) Meyrick, 1925: 96.
[*Lita leucomelanella* (Zeller); Schütze, 1926: 173, Benander, 1941: 43, fig. 3b. Misidentifications.]
[*Phthorimaea lencomelanella* (Zeller); Pierce & Metcalfe, 1935: 13, pl. 7. Incorrect subsequent spelling of *leucomelanella* Zeller. Misidentification.]
Gnorimoschema inflatellum (Chrétien) Klimesch, 1953: 311. figs 32, 33, 34, 35.
Caryocolum inflatellum (Chrétien) Gozmány, 1958: 205.
Caryocolum vicinellum (Douglas) Sattler, 1964: 156.

ADULTS (Figs 13, 14). ♂, 5·5–7·0 mm, ♀, 6·0–7·0 mm. Head blackish; frons silvery, shiny. Second segment of labial palpus whitish flecked with white and brown, outer surface dark brown; third segment blackish. Thorax and tegula dark brown. Fore wing dark brown; light dorsal margin between one- and three-fifths; two white wedge-shaped spots extended from fold towards costa at one-fifth, one-half; distal spot occasionally mottled with dark fuscous. White costal and tornal spots separate.

GENITALIA ♂ (Fig. 102). Sacculus long, broadening towards apical third, apex rounded, distoventral margin slightly concave. Posterior margin of vinculum with large hump-like projection laterally; medial processes not reaching posterior margin. Saccus slender.

GENITALIA ♀ (Fig. 167). Eighth segment with pair of narrow ventromedial folds converging towards posterior margin; apophysis posterior about 6 times length of segment. Antrum short, funnel-shaped. Ductus bursae with pair of narrow lateral sclerotizations, two tiny sclerites anteriorly. Signum with moderately broad base.

REMARKS. *C. vicinella* closely resembles *bosalella*, *leucomelanella* and *schleichi* externally. It usually differs from *bosalella* in its darker frons and from *leucomelanella* in the lack of orange-brown scales. Dissection of the genitalia is, however, necessary to confirm the identification. The male genitalia differ from *bosalella* in the less projected posterior margin of the vinculum, and the females have a longer antrum. *C. vicinella* differs from *leucomelanella* and *schleichi* in many genital characters such as the shape of the valva and the antrum.

G. vicinella was described from 2 specimens, both of which are now preserved in the BMNH. Although they are unlabelled there is almost no doubt about the origin of this material as discussed in detail by Bankes (1909: 263).

L. inflatella was described from an unspecified number of specimens. Of the syntype pair I have examined, the female is here designated as lectotype.

C. vicinella was frequently confused with *leucomelanella* in the past and subsequently synonymized with the latter by Bankes (1909). These errors were finally corrected by Klimesch (1953: 311).

BIOLOGY. Host-plants: *Spergularia rubra* (L.) J. & C. Presl (Benander, 1965: 17); *Stellaria media* (L.) Vill. (Schütze, 1931: 91); *Cerastium arvense* L. (Pröse, 1979: 66); *Silene vulgaris* (Moench) Garcke (incl. *S. maritima* With.) (Stainton, 1867: 60); *S. nutans* L., *Petrorhagia saxifraga* (L.) Link (Klimesch, 1953: 312).

A record of *Dianthus carthusianorum* L. (Povolný, 1980: 198) as a host-plant is probably due to misidentification of *leucomelanella*. Petry (1912: 117) misidentified *cassella* as *vicinella* and therefore erroneously cited *Stellaria nemorum* as a host-plant.

The larva has also been recorded from *Coronilla emerus* L. (Bruand d'Uzelle, 1858: 481). Pitkin (1984: 23) showed that this record is a misidentification of *Mirificarma maculatella* (Hübner).

The larval stage has been found in May and June feeding within spun young shoots from which it bores into the new stem. Moths were bred from late June to mid-July (pers. obs.). In the wild adults have been collected from mid-July to the middle of September. They occur mainly along pebbly shores and on scree up to 2500 m.

DISTRIBUTION. Spain, France, Great Britain, West Germany, East Germany, Austria, Italy, Greece.

Additional records. Switzerland (Sauter, 1983: 116); Sweden (Benander, 1965: 17); Finland (Jalava, 1977: 15); Denmark (Karsholt, 1985: 65); Hungary (Gozmány, 1958: 205); U.S.S.R. (European part) (Piskunov, 1981: 686).

MATERIAL EXAMINED (including 8 ♂, 5 ♀ genitalia preparations)

Lectotype ♀ (*vicinella*). **Ireland**: [near Belfast] (*Jobson*) (BMNH). Lectotype ♀ (*inflatella*), **France**: Hautes Alpes, La Grave, moth emerged 5.viii.1898 ('tigs de *Cucubalus*) (MNHN).

Spain: 1 ♂, 2 ♀, Granada, Sierra Nevada, El Parador Nat., 2500 m, 21.viii.1979 (*Traugott-Olsen*); 2 ♂, Sierra Nevada, Cam. del Veleta, 2300 m, 19.viii.1984 (*Traugott-Olsen*); 4 ♂, 2 ♀, Sierra Nevada, Road to Veleta, 2300 m, 17–19.vii.1962, 25.vii.1969 (*Sattler; Sattler & Carter*) (BMNH; coll. Traugott-Olsen, Marbella; coll. Huemer, Innsbruck). **France**: 1 ♂ (*inflatella* paralectotype), Hautes Alpes, La Grave

(MNHN); 2 ♂, Hautes Alpes, La Bessée, 1100 m, 12.ix.1960 (*Burmann*); 1 ♀, Pyrénées, Val d'Ossoue, 1500 m, 12.vii.1961 (*Burmann*) (coll. Burmann, Innsbruck); 1 ♀, Prelles, 1200 m, E. viii.1973 (*Zürnbauer*) (TLMF); 1 ♂, Basses Alpes, Maurin, 4.viii.1932 (*Fassnidge*); 2 ♂, 2 ♀, Paris, e.l. (larvae in roots of *Silene nutans*) (*Ragonot*) (BMNH). **Great Britain**: 6 ♂, 5 ♀, England, Dorset, Portland [Harb.], e.l. vii.1935, E. vi.–vii.1938 (*Ford*); 2 ♀, Devon, Strete, nr Dartmouth, 14.ix.1902 (*Bankes*) (BMNH); 8 ♂, 1 ♀ Dorset, Chesil Beach, e.l. 16.vii.1938, e.l. 30.vi.1986 (larvae 23.v. on *Silene maritima*) (*Huemer*) (coll. Huemer, Innsbruck; BMNH). 1 ♂, Isle of Man, 30.vii.1866 (BMNH); 1 ♂, 3 ♀, Wales, Pembroke, e.l. (*Silene maritima*) (BMNH). **Ireland**: 1 ♂ (*vicinella* paralectotype), [near Belfast] (*Jobson*) (BMNH). **Germany (West)**: 1 ♀, Nittendorf, e.l. (larva on *Silene nutans*) (*Hofmann*) (BMNH). **Germany (East)**: 1 ♀, Lausitz ('Lusatia'), e.l. 1927 (*Starke*). **Austria**: 2 ♀, Steiermark, Preg/Mur, Gulsen, 700 m, e.l. 24.vi.1940 (larvae 13.v. on *Silene inflata*) (*Klimesch*) (BMNH); 1 ♂, Vorarlberg, Au, 18.vii.1957 (*Süssner*); 1 ♂, Tirol, Zirl, e.l. 6.viii.1960, e.l. 18.vi.1972 (*Burmann; Hernegger*); 1 ♀, Osttirol, Matrei, Anna Kap., 1000 m, 23.vii.1962 (*Süssner*) (TLMF); 1 ♂, 1 ♀, Tirol, Umhausen, e.l. 2.vi.1948 (*Cerastium arvense*), 18.vi.1950 (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 1 ♂, Monte Baldo, Bocca di Navene, 1400 m, M.vii.1968 (*Burmann*) (coll. Burmann, Innsbruck). **Greece**: 1 ♀, Olymp, Litochoron, 1200 m, 18.viii.1973 (*Arenberger*) (coll. Arenberger, Wien); 1 ♂, 2 ♀, Achaia, Mt Chelmos, above Kalavrita, 1700 m, 4–5.x.1984 (*Fibiger*) (ZM). No locality data: 6 ♂, 1 ♀.

Caryocolum bosalella (Rebel, 1936) comb. n.

(Figs 15, 103, 168)

Lita bosalella Rebel, 1936*a*: 94. Holotype ♂, Italy (Sardinia) (LN) [examined].
Gnorimoschema bosalellum (Rebel) Klimesch, 1953: 317, fig. 42.

Adult (Fig. 15). ♂, 5·0 mm, ♀, 5·0 mm. Head light silvery, shiny; patagia dark grey-brown. Second segment of labial palpus whitish, outer surface mottled with brown; third segment dark brown. Fore wing dark brown; dorsal margin brown mixed with white; irregular white patch across cell at one-fifth and one-half; brown mottling particularly costad. White costal and tornal spots separate.

Genitalia ♂ (Fig. 103). Sacculus long, rounded apically; distal part concave ventrally. Posterior margin of vinculum with distinct lateral projection and pair of short medial processes. Saccus slender.

Genitalia ♀ (Fig. 168). Eighth segment with pair of narrow ventromedial folds converging towards posterior margin; short ventrolateral folds present; apophysis posterior 6 times length of segment. Antrum almost absent. Posterior part of ductus bursae with pair of comparatively short lateral sclerotizations. Signum with broad base.

Remarks. *C. bosalella* closely resembles *vicinella*, *leucomelanella* and *schleichi* externally. It usually differs from *vicinella* in its light head, the extended whitish markings of the fore wing and its smaller size. It may usually be separated from *leucomelanella* by the lack of orange-brown scales. *C. bosalella* is extremely similar to *vicinella* in genital characters although minute differences were found in the shape of the valva, the more distinctly projected posterior margin of the vinculum and the almost completely absent antrum. Both male and female genitalia are easy to distinguish from those of *leucomelanella* and *schleichi* by many structures such as the shape of the valva and the antrum.

L. bosalella was described from a single male collected in Sardinia. There is insufficient material to determine the true taxonomic status of *bosalella* and I tentatively regard it as a good species.

Biology. Host-plant unknown. Moths have been collected from early August to early September.

Distribution. Italy (Sardinia).

Material examined (including 1 ♂, 1 ♀ genitalia preparations)
Holotype ♂, **Italy**: Sardinia, Aritzo, 9.ix.1934 (*Predota*) (genitalia slide no. 502a Klimesch; LN).
Italy: 1 ♀, Sardinia, Gennargentu, Mt Spina, 1300 m, 7.viii.1974 (*Baldizzone*) (coll. Baldizzone, Asti).

The *sciurella*-group

Characters as described under *sciurella*.

Caryocolum sciurella (Walsingham, 1908)

(Figs 16, 104, 169)

Gelechia sciurella Walsingham, 1908: 941, pl. 51, fig. 14. Holotype ♀, Portugal (Madeira Islands) (BMNH) [examined].

Lita rubidella Chrétien, 1908*d*: 361. Holotype ♂, Spain (Canary Islands) (MNHN) [examined].
Phthorimaea sciurella (Walsingham) Meyrick, 1925: 96.
Phthorimaea rubidella (Chrétien) Meyrick, 1925: 96.
Caryocolum rubidellum (Chrétien) Povolný, 1983: 177, figs 2, 9.
Caryocolum sciurella (Walsingham) Klimesch, 1984: 158, figs 48, 49, 50.

Adult (Fig. 16). ♂, 4·5–5·0 mm, ♀, 5·5 mm. Head mottled grey; frons whitish. Third segment of labial palpus blackish white, first and second segments light to mid-brown, inner surface mottled with white. Thorax and tegula as head, light brown distally. Fore wing grey-brown; dorsal margin predominantly greyish white; two wedge-shaped greyish white markings across fold at one-quarter and middle, three black spots in between and distally. White fascia at four-fifths indistinct. Apex mottled with black. Orange-brown scales along subcosta.

Genitalia ♂ (Fig. 104). Tegumen very broad anteriorly. Uncus with U-shaped dorsal fold. Valva straight, short, apex rounded. Sacculus with rounded apex, shorter than valva. Vinculum stout; posterior margin with pair of extremely enlarged, almost rectangular projections; medial incision narrow. Saccus short, slender. Aedeagus short, apically with numerous minute cornuti.

Genitalia ♀ (Fig. 169). Eighth segment without process. Antrum short, tubular; pair of strong ventromedial folds, joining towards posterior margin of segment. Weakly sclerotized plate in ductus bursae. Ductus and corpus bursae densely covered with microtrichia. Signum with extremely long, big hook, additional teeth at base.

Remarks. Externally *C. sciurella* resembles *provinciella*, *marmoreum* and contrastedly marked specimens of *pullatella*. It is distinguished from *provinciella* by its pale frons and the grey rather than brown head and thorax. Both male and female genitalia clearly differ from those of *provinciella*, *marmoreum* and *pullatella* in the shape of the valva and sacculus, the posterior margin of the vinculum and the shape of the signum.

The description of *sciurella* was published on 4 June, 1908, the year in which *rubidella* was also described. The exact publication date of *rubidella* is not stated; following the *International Code of Zoological Nomenclature*, Article 21 (c) (ii), 31 December, 1908, is adopted as the date of publication.

Biology. Host-plant unknown. Moths have been collected from late February to mid-April.

Distribution. Portugal (Madeira Islands), Spain (Canary Islands).

Material examined (including 2 ♂, 1 ♀ genitalia preparations)

Holotype ♀ (*sciurella*), **Portugal**: Madeira [Islands], Funchal, 2600 ft, 8.iii.1902 (*Eaton*) (genitalia slide no. 7158; BMNH). Holotype ♂ (*rubidella*), **Spain**: [Canary Islands] Grande Canarie, Env. de San Mateo La Lechusa, 1903 (*Lesne*) (genitalia slide Povolný; MNHN).

Spain: 5 ♂ (*sciurella* paratypes), [Canary Islands,] Tenerife, 27.ii.–13.iv.1907 (BMNH).

The *nepalense*-group

Genitalia ♂. Transtilla weakly sclerotized, without spines. Valva long, sword-shaped. Sacculus short, slender, pointed. Posterior margin of vinculum with two pairs of broad, rounded processes. Saccus slender. Aedeagus long, slender, with slightly curved apex, vesica without cornuti.

Genitalia ♀. Eighth segment without process; numerous narrow folds ventromedially. Antrum a long funnel. Posterior part of ductus bursae with pair of short lateral sclerotizations.

Biology. Host-plant unknown.

Caryocolum nepalense Povolný, 1968

(Figs 17, 105, 170)

Caryocolum nepalense Povolný, 1968*a*: 118, figs 3, 4, 4a, 5, 6. Holotype ♂, Nepal (ZSBS) [examined].

Adult (Fig. 17). ♂, 5·5–6·5 mm, ♀, 5·0–6·0 mm. Head dark grey speckled with white; frons whitish. Labial palpus dark brown mottled with white; inner surface of second segment predominantly white. Thorax and tegula as head, sometimes cream distally. Fore wing dark brown, evenly mottled with white scales. White markings: transverse streak from fold to costa at one-fifth; indistinct medial spot; costal and tornal spots confluent, occasionally reduced. Black fascia from fold to costa at one-quarter. Markings lined with orange-brown.

Genitalia ♂ (Fig. 105). Valva elongated, slightly curved, sword-shaped. Sacculus shorter than valva,

knife-shaped, tapered to fine point. Posterior margin of vinculum slightly incised medially, with pair of broad medial processes and pair of large hump-like lateromedial processes. Saccus long, slender. Anellus with pair of small pegs. Aedeagus long, slender, with slightly bent apex.

Genitalia ♀ (Fig. 170). Eighth segment without process; numerous narrow longitudinal ventromedial folds, extending into antrum; apophysis anterior 1·5 times length of eighth segment; apophysis posterior short, about 1·3 mm. Antrum long, funnel-shaped, reaching beyond second third of apophysis anterior. Pair of long lateral sclerites in ductus bursae. Signum with slightly bent, short hook.

Remarks. *C. nepalense* is characterized by its contrasting fore wing pattern which is sometimes almost reduced to the mottling of the ground colour with some additional black spots and orange-brown scales. The male genitalia are characterized by the shape of the valva and sacculus, the female genitalia especially by the ventral folds of the eighth segment. This species closely resembles *longiusculum* in genital characters but differs in the longer saccus, shorter valva, longer antrum and the shape of the signum.

C. nepalense was described from 13 specimens collected by Dierl.

Biology. Host-plant unknown. Moths have been caught from early April to early July and from late October to early November, suggesting possible bivoltinism. *C. nepalense* occurs at altitudes of 1500–3800 m.

Distribution. Nepal.

Material examined (including 4 ♂, 3 ♀ genitalia preparations)

Holotype ♂, **Nepal**: Prov. Nr. 3 East Khumjung, 3800 m, 17.vi.–1.vii.1964 (*Dierl*) (ZSBS).

Nepal: 1 ♂, 1 ♀ (paratypes), Prov. Nr. 3 East Khumjung, 3800 m, 17.vi.1964, 1.vii.1964 (*Dierl*) (ZSBS); 6 ♂, 6 ♀, Kathmandu Distr., Phulchoki, 8800′, 27–31.v.1983 (primary montane oak forest) (*Allen, Brendell, Robinson, Tuck*); 1 ♂, Phulchoki, 2000–2500 m, 3.vii.1984 (oak-laurel forest) (*Allen*); 1 ♂, 1 ♀, Chautara Distr., Nauling Lekh, 9500′, 11–20.vi.1983 (Rhodo./conifer moss forest); 2 ♂, 5 ♀, Chautara Dist., Choche Ridge, 10,500′, 12–17.vi.1983 (Rhodo./conifer moss forest); 1 ♂, 2 ♀, Chautara Distr., Hile Bhanjyang, 11,500′, 13–16.vi.1983 (*Allen, Brendell, Robinson, Tuck*); 1 ♀, Chautara Dist., Phure Maidan, 24.x.1983, 2750 m (*Allen*); 3 ♀, Chautara Dist., Choche Lekh, 3500 m, 9.vii.1984 (*Allen*); 1 ♀, Godaveri, 1550–1700 m (all BMNH).

Caryocolum longiusculum sp. n.

(Figs 18, 19, 106, 171)

Adult (Figs 18, 19). ♂, 6·5 mm, ♀, 6·0 mm. Head cream, mixed with light brown; frons cream. Labial palpus cream; third segment mottled with dark brown. Thorax and tegula cream, mottled with clay-colour. Fore wing light brown, speckled with whitish and orange-brown. Dark brown markings: near base; broken fascia from fold to costa at one-quarter; spots costad of cell at two-fifths and three-fifths, the latter frequently extended towards tornus; apex dark brown. White apical fascia indistinct.

Genitalia ♂ (Fig. 106). Valva very long, sword-shaped, slightly curved. Sacculus short, knife-shaped, tapered to a fine point. Posterior margin of vinculum with pair of broad medial processes; pair of large hump-like lateromedial processes. Saccus short, slender. Aedeagus long, slender, slightly bent.

Genitalia ♀ (Fig. 171). Eighth segment without process; indistinct narrow ventromedial folds; apophysis anterior 1·5 times length of eighth segment; apophysis posterior long, about 2·4 mm. Antrum short, funnel-shaped, anteriorly with concave emargination. Ductus bursae with pair of short lateral sclerites, reaching about middle of apophysis anterior. Signum with large, strongly bent hook, distal part lanceolate.

Remarks. *C. longiusculum* closely resembles *vartianorum* in the fore wing pattern and colour but differs in the light colour of the head and the thorax and the numerous light brown scales of the fore wing. In genital characters it is very similar to both *vartianorum* and *nepanelse*. The female genitalia differ in the distinctly shorter antrum, the longer apophysis posterior and the shape of the signum. The male genitalia are distinguishable from those of *nepalense* by the longer valva and the much shorter saccus; the male of *vartianorum* is as yet unknown.

Biology. Host-plant unknown. Moths have been collected during the last third of July at an altitude of 2100 m.

Distribution. Afghanistan.

Material examined (including 1 ♂, 1 ♀ genitalia preparations)

Holotype ♂, **Afghanistan**: Paghman, 30 km NW. of Kabul, 2100 m, 20–30.vii.1962 (*Vartian & Vartian*) (genitalia slide no. 13451; NM).

Paratypes. **Afghanistan**: 3 ♀, same data as holotype (NM).

Caryocolum vartianorum sp. n.

(Figs 20, 172)

ADULT (Fig. 20). ♀, 6·0 mm. Head mottled grey-brown; frons whitish. Second segment of labial palpus whitish, mottled with mid-brown; third segment blackish, flecked with white. Thorax and tegula grey-brown, speckled pale. Fore wing whitish mottled with light brown. Distinct dark brown markings, often lined with orange-brown: broken fascia from fold to costa at one-quarter; spots costad of cell at one-half, three-fifths, latter comma-shaped; apex dark brown. Whitish costal and tornal spots indistinct.

GENITALIA ♂. Unknown.

GENITALIA ♀ (Fig. 172). Eighth segment without process; some narrow ventromedial folds; apophysis anterior about length of eighth segment; apophysis posterior short, about 1·1 mm. Antrum long, funnel-shaped, anteriorly with concave emargination. Posterior part of ductus bursae with pair of short lateral sclerites posteriorly, extending slightly beyond apex of apophysis anterior. Signum with moderately large, pointed, hook.

REMARKS. *C. vartianorum* closely resembles *longiusculum* externally and in genital characters. It differs externally in the fuscous mottled head and thorax and in the genitalia in the distinctly shorter apophyses, longer antrum and the shape of the signum. *C. vartianorum* differs from the closely related *nepalense* in the concave emargination of the antrum and the shape of the signum and is also distinguished by the fore wing pattern and colour.

BIOLOGY. Host-plant unknown. Moths have been collected from late July to early August between 2100 m and 2500 m.

DISTRIBUTION. Afghanistan.

MATERIAL EXAMINED (including 2 ♀ genitalia preparations)

Holotype ♀. **Afghanistan**: Paghman, 30 km NW. of Kabul, 2100 m, 20–30.vii.1962 (*Vartian & Vartian*) (genitalia slide no. 13452; NM).

Paratype. **Afghanistan**: 1 ♀, same data as holotype but 2500 m, 4–8.viii.1965 (*Kasy & Vartian*) (NM).

The *tetrameris*-group

GENITALIA ♂. Transtilla weakly sclerotized, without spines. Valva broad, apex rounded. Distal part of sacculus hammer-shaped. Posterior margin of vinculum with medial incision and pair of broad lateromedial emarginations resulting in two pairs of broad indistinct processes. Saccus long, slender. Aedeagus long, slender, curved, small number of minute cornuti apically.

GENITALIA ♀. Eighth segment without process; with numerous narrow ventromedial folds. Antrum funnel-shaped. Ductus bursae with pair of long lateral sclerotizations.

BIOLOGY. Host-plant unknown.

Caryocolum tetrameris (Meyrick, 1926)

(Figs 21, 107, 173)

Gelechia tetrameris Meyrick, 1926: 277. Lectotype ♂, TURKEY (BMNH), designated by Clarke, 1969: 164 (as 'type') [examined].

Gnorimoschema tetrameris (Meyrick) Clarke, 1969: 164, pl. 82, figs 4, 4a, 4b.

ADULT (Fig. 21). ♂, 6·0–7·0 mm, ♀, 7·0 mm. Head white. Labial palpus white, outer surface sprinkled with brown. Thorax and tegula white, mottled with mid-brown. Fore wing white, flecked with mid-brown; indistinct dark brown markings: patch at base; broken fascia from fold to costa at one-quarter; small medial spot at one-half; broad fascia at three-quarters; apex dark brown. White transverse fascia at four-fifths.

GENITALIA ♂ (Fig. 107). Valva short, broad, digitate, slightly tapered towards rounded apex. Sacculus with broad, hammer-shaped distal part. Posterior margin of vinculum with sinus-shaped medial and reduced lateromedial processes. Saccus with comparatively broad base. Aedeagus long slender, slightly S-curved.

GENITALIA ♀ (Fig. 173). Eighth segment without process; with numerous narrow ventromedial folds; apophysis posterior long, up to about 2·5 mm. Antrum moderately long, funnel-shaped. Posterior part of ductus bursae with pair of long lateral sclerotizations reaching almost beyond apices of apophyses anteriores. Signum with comparatively long hook from broad base.

REMARKS. *C. tetrameris* resembles *paghmanum* in fore wing pattern but differs in the larger wingspan, the mottled ground colour and the narrow apical fascia. The genitalia are very similar to those of *paghmanum* but they are distinguishable by the more slender valva and sacculus and the broader base of the saccus in the male. The female genitalia differ in the longer antrum and the long signum hook.

G. tetrameris was described from 2 specimens collected in Turkey, both of which I have examined.

BIOLOGY. Host-plant unknown. Moths have been collected from June to the middle of August up to an altitude of 3000 m.

DISTRIBUTION. Turkey, Iran, Afghanistan.

MATERIAL EXAMINED (including 6 ♂, 1 ♀ genitalia preparations)

Lectotype ♂, **Turkey**: Maraş ('Marasch'), [19]25 (*C[aradja]*) (genitalia slide no. 9077; BMNH).

Turkey: 1 ♂ (paralectotype), Maraş, 1925 (*Meyrick*) (BMNH); 1 ♂, Taurus Mts, Maraş, vi.1929 (ZSBS). **Iran**: 1 ♂, Fars, road Ardekan-Talochosroe, 2600 m, 15.viii.1937 (*Brandt*) (LN; only genitalia slide examined). **Afghanistan**: 2 ♂, 1 ♀, Band-i-Amir, 3000 m, 30.vii.1963 (*Kasy & Vartian*) (NM; BMNH).

Caryocolum paghmanum sp. n.

(Figs 22, 108, 174)

ADULT (Fig. 22). ♂, 5·5–6·0 mm, ♀, 6·0 mm. Head cream. Labial palpus cream, mottled with some light brown scales on outer surface; third segment flecked with dark brown. Thorax and tegula cream, rarely speckled with brown. Fore wing cream; indistinct dark brown markings frequently mottled with cream scales: basal fascia; broken fascia from fold to costa at one-quarter; broad patch across third quarter; apex with some dark scales. Cream costal and tornal spots confluent, forming a very broad fascia.

GENITALIA ♂ (Fig. 108). Valva very broad, gently tapered towards apex. Sacculus with very broad hammer-shaped distal part. Posterior margin of vinculum with indistinct lateromedial and sinus-shaped medial pair of processes. Saccus slender. Aedeagus long, slender, S-curved.

GENITALIA ♀ (Fig. 174). Eighth segment without process; numerous narrow ventromedial folds; apophysis posterior long, up to about 2·5 mm. Antrum short, funnel-shaped. Posterior part of ductus bursae with pair of lateral sclerites, reaching beyond second third of apophysis anterior. Signum: short hook from small base.

REMARKS. *C. paghmanum* is characterized by the cream ground colour of the fore wing which is hardly mottled with brown. It furthermore differs from the related *tetrameris* in the broad apical fascia and the smaller size. The male genitalia are very similar to those of *tetrameris*, but in *paghmanum* the valva and the sacculus are broader, the saccus is more slender basally and the aedeagus is more strongly curved. The female genitalia are distinguished from those of *tetrameris* by the longer apophysis anterior, the shorter antrum and the small signum hook.

BIOLOGY. Host-plant unknown. Moths have been collected in the last third of July and in early August between 2100 m and 2500 m.

DISTRIBUTION. Afghanistan.

MATERIAL EXAMINED (including 2 ♂, 2 ♀ genitalia preparations)

Holotype ♂, **Afghanistan**: Paghman, 30 km NW. of Kabul, 2200 m, 20–22.vii.1963 (*Kasy & Vartian*) (genitalia slide no. 24288; BMNH).

Paratypes. **Afghanistan**: 1 ♂, 1 ♀, same data as holotype but 2100 m, 20–30.vii.1962 (*Vartian*) (NM; coll. Klimesch, Linz); 1 ♂, 1 ♀, same data as holotype; 2 ♀, same data as holotype but 2500 m, 20–24.vii.1965, 4–8.viii.1965 (*Kasy & Vartian*) (BMNH).

The *mongolense*-group

Characters as described under *mongolense*.

Caryocolum mongolense Povolný, 1969

(Figs 23, 109)

Caryocolum mongolense Povolný, 1969: 25, pl. 28, fig. 101, pl. 32, fig. 30. Holotype ♂, MONGOLIA (TM) [examined].

ADULT (Fig. 23). ♂, 7·5–8·0 mm. Head whitish mottled with dark brown. Labial palpus mid- to dark brown, mottled with white on inner surface, particularly of second and base of third segment. Thorax and tegula dark brown, slightly shiny, some whitish scales, particularly distad. Fore wing dark grey-brown, without markings.

GENITALIA ♂ (Fig. 109). Transtilla membranous, without spines. Valva short, broadly thumb-shaped, apex rounded. Sacculus short, ovate, ventral margin slightly concave. Posterior margin of vinculum with two pairs of distinct processes; medial emargination deep, U-shaped; lateromedial emargination shallow. Saccus slender, particularly distal part. Aedeagus long, small number of minute cornuti.

GENITALIA ♀. Unknown.

REMARKS. *C. mongolense* is easily recognizable by its almost unicolorous fore wings and the large wingspan. The genitalia are characterized by the shape of the valva, sacculus and saccus. They somewhat resemble those of *tetrameris* but on account of the differences in the shape of the sacculus, posterior margin of the vinculum and the aedeagus, I tentatively place *mongolense* in a separate species-group.

C. mongolense was described from 2 ♂ both of which I have examined.

BIOLOGY. Host-plant unknown. Moths have been collected during late August at 1200 m.

DISTRIBUTION. Mongolia.

MATERIAL EXAMINED (including 2 ♂ genitalia preparations)

Holotype ♂, **Mongolia**: Chentej aimak, 7 km NE. of Somon Mörön, 1200 m, 21.viii.1965 (*Kaszab*) (genitalia slide no. 3368 Povolný; TM).

Mongolia: 1 ♂ (paratype), same data as holotype (LN).

The *amaurella*-group

Characters as described under *amaurella*.

Caryocolum amaurella (Hering, 1924)

(Figs 24, 110, 175, 176)

Lita amaurella Hering, 1924: 82, figs 11, 12. Syntypes, FINLAND: Bromarf, 4.viii.1916 (*Fabricius*) [not traced].

Lita viscariae Schütze, 1926: 171. Syntypes, GERMANY (EAST): [near Rachlau,] ex *Lychnis viscaria (Schütze)* [not traced]. [Synonymized by Hackman, [1950]: 19.]

Lita viscariae Schütze; Benander, 1928: 80, pl. 6, fig. 42; 1941: 43, fig. 2c.

Phthorimaea amaurella (Hering) Gaede, 1937: 248 (partim).

Phthorimaea viscariae (Schütze) Gaede, 1937: 293.

Gnorimoschema amaurellum (Hering) Klimesch, 1953: 319.

Gnorimoschema amaurellum var. *viscariae* (Schütze) Klimesch, 1953: 319, figs 45, 46.

Caryocolum amaurellum viscariae (Schütze) Gozmány, 1958: 208.

Caryocolum viscariae (Schütze); Hartig, 1964: 44.

ADULT (Fig. 24). ♂, ♀, 5·0–6·0 mm. Head blackish; frons light to dark silvery white. Labial palpus blackish, mottled with white on inner surface. Thorax blackish, mottled with grey. Tegula as thorax, apex lighter. Fore wing blackish, with scattered white and brown scales particularly along dorsal margin and across first quarter and middle. White costal and tornal spots separate.

GENITALIA ♂ (Fig. 110). Tegumen short; transtilla weakly developed, without spines. Valva linear, short, apex rounded. Sacculus short; dorsal margin convex, ventral margin angular; distally with small sharp point. Posterior margin of vinculum with two pairs of short processes. Saccus with moderately broad base, gradually tapered. Aedeagus slender, straight, with some apical cornuti.

GENITALIA ♀ (Figs 175, 176). Eighth segment without process; large ovate ventromedial sclerotization, with numerous narrow folds. Antrum short, funnel-shaped. Ductus bursae with pair of narrow lateral sclerotizations and two tiny posterior sclerites. Signum: slender, strongly bent hook.

REMARKS. *C. amaurella* is very similar in fore wing pattern to dark specimens of *petryi*, *alsinella* and *mucronatella*. It usually differs by the distinct white costal and tornal spots at four-fifths. In the genitalia *amaurella* is characterized by the distinctly pointed apex of the sacculus, the shape of the vinculum and the antrum.

A series of females bred from *Silene otites* in Switzerland shows a much longer signum-hook than typical specimens (Fig. 176) but in the absence of males the taxonomic status cannot be further assessed.

L. amaurella was described from an unspecified number of specimens collected in Finland. No syntypes were located but the illustration of the male genitalia in the original description leaves no doubt as to the identity of this species.

L. viscariae was described from an unspecified number of specimens bred ex *Lychnis viscaria*. No type-locality is stated in the original description; however, according to Schütze the type-specimens were misidentified by him in an earlier paper (Schütze, 1902: 18) where this locality was given as Rachlau (East Germany).

Gaede (1937: 248) erroneously associated *L. amaurella* Rebel with *L. amaurella* Hering; however, Rebel's species is a junior primary homonym of the latter and is currently considered to be a junior synonym of *Neofriseria singula* (Staudinger) (Povolný, 1964: 54).

BIOLOGY. Host-plant: *Lychnis viscaria* L. (= *Viscaria vulgaris* Bernh.).

The larvae have been found during April and May, feeding between spun terminal shoots. The later stages feed within the stem, and the young shoots often become swollen and stunted (Schütze, 1931: 88). Moths have been collected from the last third of June to late September.

DISTRIBUTION. Denmark, Norway, Sweden, Finland, East Germany, Switzerland, Austria, Italy.

Additional record. Hungary (Klimesch, 1953: 319).

Records from Spain (e.g. Gaede, 1937: 248) are erroneous and refer to *Neofriseria singula* (Staudinger).

MATERIAL EXAMINED (including 4 ♂, 4 ♀ genitalia preparations)

Denmark: 2 ♂, 3 ♀, Bornholm, Hammeren, 18.vii.1977 (*Karsholt*) (ZM). **Norway**: 3 ♂, 1 ♀, On, Nord-Fron, Vinstra, 4–5.vii.1984, 27–28.vi.1985 (*Tuck; Karsholt*) (ZM; BMNH). **Sweden**: 3 ♂, 2 ♀, Maglehem, 26.vi.–10.vii.1965 (*Svensson*); 1 ♀, Sm. Högsby, 13.vii.1968 (*Johansson*) (ZM). **Finland**: 1 ♂, U. Sluntle, 18–31.vii.1982 (*Karsholt*) (ZM). **Germany (East)**: 1 ♂, 1 ♀, Lausitz ('Lusatia'), near Bautzen, e.l. 1935 (*Lychnis viscaria*) (*Starke*) (BMNH). **Switzerland**: 2 ♀, VS, Martigny-Rosel, 460 m, e.l. 28.vi.–14.vii.1983 (larvae 25.v. spinning leaves of *Silene otites*) (*Whitebread*) (coll. Whitebread, Magden); 1 ♀, Andermatt, vii.1953 (*Jacobs*) (BMNH). **Austria**: 1 ♂, Nieder-Österreich, Theresienfeld, 10.vii.1965 (*Glaser*); 1 ♂, Nieder-Österreich, Rastenfeld, 24.vii.1965 (*Glaser*) (BMNH). **Italy**: 1 ♂, Südtirol, Taufers, 1300 m, 22.viii.1978 (*Burmann*) (coll. Burmann, Innsbruck); 1 ♂, Vinschgau, Laas, E. ix.1985 (*Burmann, Huemer, Tarmann*) (coll. Huemer, Innsbruck).

The *oculatella*-group

Characters as described under *oculatella*.

Caryocolum oculatella (Thomann, 1930)

(Figs 25, 26, 111, 177)

Lita oculatella Thomann, 1930: 24. [Objective replacement name for *Lita ochraceella* Thomann.]
Lita ochraceella Thomann, 1929: 191. Syntypes, SWITZERLAND [examined]. [Junior primary homonym of *Lita ochraceella* Chrétien (Gelechiidae).]
Phthorimaea oculatella (Thomann) Gaede, 1937: 277.
Gnorimoschema oculatellum (Thomann) Klimesch, 1953: 317, figs 43, 44.
Caryocolum oculatellum (Thomann); Povolný, 1980: 197.

ADULT (Figs 25, 26). ♂, ♀, 5·0–5·5 mm. Head ochre. Labial palpus ochre, outer surface with few dark brown scales, particularly on third segment. Thorax and tegula ochre, mottled with light brown. Fore wing dark brown to blackish; dorsal margin lighter, speckled brown; white fascia from fold to costa at one-fifth; light brown fascia at one-half with distinct white medial patch. Costal and tornal spots usually confluent, forming a narrow white fascia, rarely separate.

GENITALIA ♂ (Fig. 111). Uncus very broad, rounded. Transtilla membranous, without spines. Valva short, slender, gradually tapered. Sacculus shorter than valva, semicircular. Posterior margin of vinculum with deep, rectangular emargination and slight medial incision; with pair of small lateral processes. Saccus with moderately broad base, evenly tapered. Aedeagus short, straight, some minute cornuti.

GENITALIA ♀ (Fig. 177). Eighth segment without process; with large ovate ventromedial sclerotization. Antrum short, ring-shaped. Posterior part of ductus bursae with pair of long, medially broadened sclerotizations. Signum a stout, strongly bent hook.

REMARKS. *C. oculatella* is easily recognized by the cream head and thorax, the characteristic fore wing markings and its genitalia.

A single male collected in Spain (Sierra Nevada) is characterized by its white rather than ochre head and thorax and the extended white markings of the fore wing, forming three distinct fasciae (Fig. 26). Its genitalia slightly differ from those of specimens from the Alps in the shape of the uncus, tegumen and sacculus.

L. ochraceella was described from about three dozen specimens bred by Thomann. The objective replacement name *oculatella* was proposed by the same author a year later. Several syntypes have been examined; designation of a lectotype is postponed until specimens from the Thomann collection become available.

BIOLOGY: Host-plant: *Gypsophila repens* L. (type-series bred by Thomann).

Larvae have been found between spun terminal shoots and moths emerged from late June to early July (Thomann, 1929: 191).

DISTRIBUTION. Switzerland (Graubünden), ? Spain (Sierra Nevada).

Additional record. Austria (Tirol) (Burmann, 1980: 150).

A specimen from Mongolia recorded as near to *amaurella* (Povolný, 1973: 22) could refer to this species.

MATERIAL EXAMINED (including 2 ♂, 2 ♀ genitalia preparations)

Switzerland: 2 ♂, 5 ♀ (syntypes), [Graubünden,] Martinsbruck, e.l. 22.vi.–1.vii.1928 (*Thomann*) (coll. Burmann, Innsbruck; BMNH). ? **Spain**: 1 ♂, Granada, Sierra Nevada, Ruta del Veleta, 1900 m, 24.viii.1984 (*Kavin & Skou*) (ZM).

The *petryi*-group

GENITALIA ♂. Transtilla with or without spines. Valva long, slender, gradually tapered. Sacculus broad, usually large. Posterior margin of vinculum with two pairs of distinct processes, separated by deep medial emargination. Aedeagus short, stout, sometimes very long, slender, strongly bent, minute cornuti at apex.

GENITALIA ♀. Eighth segment without process, usually with two pairs of strong longitudinal ventromedial folds. Antrum extremely broad, long, funnel-shaped. Posterior part of ductus bursae with pair of long lateral sclerotizations and two tiny anterior sclerites.

BIOLOGY. Host-plant: Silenoideae (*Gypsophila*).

Caryocolum petryi (Hofmann, 1899)

(Figs 27–30, 112, 178)

Lita petryi Hofmann, 1899: 139. LECTOTYPE ♂, GERMANY (EAST) (BMNH), here designated [examined].

Lita (Gelechia) rougemonti Rebel, 1907: 236. LECTOTYPE ♂, SWITZERLAND (NM), here designated [examined]. **Syn. n.**

Lita petryi Hofmann; Petry, 1912: 115; Martini, 1916: 141.

Phthorimaea rougemonti (Rebel) Meyrick, 1925: 96.

Phthorimaea petryi (Hofmann) Meyrick, 1925: 96; Svensson, 1979: 92.

Lita petryi benanderi Hering, 1933: 86, figs 1, 2. LECTOTYPE ♂, SWEDEN (MNHU), here designated [examined].

Lita rougemonti Rebel; Müller-Rutz, 1934: 123, pl. 1, fig. 10.

Gelechia petryi (Hofmann) Rapp, 1936: 114.

Lita petryi benanderi (Hering); Benander, 1941: 43, fig. 3c.

Gnorimoschema rougemonti (Rebel) Klimesch, 1953: 281, figs 28, 29.

Gnorimoschema petryi (Hofmann) Klimesch, 1954: 275, figs 5, 6.

Gnorimoschema petryi benanderi (Hering) Klimesch, 1954: 275.

Phthorimaea petryi (Hofmann) Meyrick, 1925: 96; Svensson, 1979: 92.

Caryocolum petryi (Hofmann) Gozmány, 1958: 199.

Caryocolum rougemonti (Rebel); Povolný, 1980: 198; Whitebread, 1984: 13.

ADULT (Figs 27–30). ♂, 4·0–7·0 mm, ♀, 4·0–6·0 mm. Head light brown to almost black, shiny; frons whitish grey. Labial palpus light brown to black; inner surface of second segment lighter, sometimes

whitish. Thorax and tegula as head. Fore wing grey, dark brown, sometimes black; orange-brown at dorsal margin, across wing near base and middle. Light markings sometimes completely reduced. Orange-brown costal and tornal spots separate or confluent, forming a fascia, frequently reduced.

GENITALIA ♂ (Fig. 112). Transtilla with minute spines. Valva long, slender, distal part evenly tapered. Sacculus up to three times breadth of valva, thumb-shaped, apex rounded. Posterior margin of vinculum with pair of broad, rounded medial processes; lateral processes small, short. Saccus long, slender. Anellus with two tiny pegs. Aedeagus long, slender, slightly S-curved.

GENITALIA ♀ (Fig. 178). Eighth segment without process; two pairs of longitudinal ventrolateral folds; apophysis anterior same length as eighth segment; apophysis posterior 4 times length of anterior. Antrum broad, funnel-shaped, extending to about middle of apophyses anteriores. Posterior part of ductus bursae with pair of long lateral sclerotizations and two tiny lateral sclerites. Signum a slender hook.

REMARKS. *C. petryi* externally exhibits considerable geographical and individual variation. The head, labial palpus, thorax and tegula vary from light to mid-brown and sometimes almost black. The fore wing colour ranges from grey to dark brown or blackish and the orange-brown markings are sometimes extended or almost completely reduced. Specimens from northern Europe are usually darker and smaller in wingspan than those from the south and were previously considered as subspecies *benanderi*. This seems unjustified because of the individual variation within the different populations. The larger size of specimens from the type-locality of *petryi* is probably due to different microclimatic conditions in the larval habitat.

C. petryi resembles *cauligenella*, *amaurella*, *viscariella*, *inflativorella* in the fore wing pattern and colour. It is distinguished from *cauligenella* by the dark head and thorax, from *amaurella* by the orange-brown costal and tornal spots at three-quarters. *C. petryi* also differs from the externally similar species in the shape of the sacculus, the posterior margin of the vinculum, the ventral folds of the eighth female segment and the large antrum. The genitalia indicate the close relationship of *petryi* to *repentella*, but the former differs in the broader, rounded sacculus, the less curved aedeagus and the distinctly shorter antrum.

L. petryi was described from an unspecified number of specimens bred by Petry in the area of Nordhausen and Frankenhausen (Kyffhäuser, East Germany). Out of the 6 ♂, 11 ♀ syntypes I have examined, a male, already labelled 'lectotype' by Sattler, is here designated as such.

L. rougemonti was described from three specimens bred by de Rougemont from larvae collected by Müller-Rutz. I have examined a male syntype which is here designated as lectotype.

L. petryi benanderi was described from an unspecified number of specimens bred by Benander. I have examined 1 ♂, 1 ♀ syntypes; the male is here designated as lectotype.

BIOLOGY. Host-plants: *Gypsophila fastigiata* L. (Hofmann, 1899: 143; Hering, 1933: 88); *G. paniculata* L. (Klimesch, 1954: 275); *G. repens* L. (Müller-Rutz, 1934: 123).

The record 'bred from an alpine Alsine' (Rebel, 1907: 236) refers to *Gypsophila repens* (Müller-Rutz, 1934: 124).

The larvae live in June between spun leaves and pupate within the feeding place, the moths emerging from late June to early August (Hofmann, 1899: 144; Hering, 1933: 88; Müller-Rutz, 1934: 124). In high altitudes of the Alps the larvae have been found from July into August and moths were bred from the last third of July to early September.

DISTRIBUTION. Sweden, France, East Germany, Switzerland, Hungary, U.S.S.R. (European part).

Additional record. Austria (Burmann, pers. comm.).

Adamczewski (1947: 106) records a *Lita* sp. bred from *Gypsophila fastigiata* from Poland. Although I could not trace these specimens it seems possible that they belong to *petryi*.

C. petryi is a very local species, according to the distribution of its host-plant.

MATERIAL EXAMINED (including 10 ♂, 6 ♀ genitalia preparations)

Lectotype ♂ (*petryi*), **Germany (East)**: [Thüringen, Kyffhäuser,] Alt. Stolb., larva on *Gypsophila fastigiata*, e.l. 12.vii.1896 (*Petry*) (BMNH). Lectotype ♂ (*rougemonti*), **Switzerland**: Wallis, Binn, e.l. 5.viii.[19]05 ('*Alsine*') (*Müller-Rutz*) (genitalia slide no. 1815; NM). Lectotype ♂ (*petryi benanderi*), **Sweden**: Vickleby, e.l. 14.vii.1929 (*Benander*) (genitalia slide no. 156 Hering [not traced]; MNHU).

Sweden: 1 ♀ (*petryi benanderi* paralectotype), Vickleby, e.l. 14.vii.1929 (*Benander*) (MNHU); 2 ♂, 1 ♀, Öl, Karums alvar, 26–28.vi.1959 (*Svensson*); 1 ♀, Öl, Högsrum, e.l. 15.vii.1967 (*Svensson*) (coll. Svensson, Österslöv); 3 ♂, 3 ♀, Öl, Möckelmossen, larva 30.v.1981 (*Gypsophila fastigiata*) (*Karsholt*); 2 ♂, 2 ♀, Öl, Högsrum, larva 2.vi.1974 (*Gypsophila fastigiata*) (*Johansson*) (ZM); 2 ♂, Öl, Vickleby, e.l. 14.vii.1929 (BMNH). **France**: 2 ♂, 2 ♀, Pyrenees, Val d'Ossoue, 1500 m, e.l. vii.1961 (*Gypsophila repens*) (*Burmann*) (coll. Burmann, Innsbruck). **Germany (East)**: 4 ♀ (*petryi* paralectotypes), [Thüringen,] e.l. 3.vii.1892, e.l. 25.vii., e.l. 24.vi.1894, e.l. 3.vii.1898 (*Gypsophila fastigiata*) (*Petry*); 1 ♂ (*petryi* paralec-

totype), Nordhausen, e.l. 1896 (*Gypsophila*) (*Petry*); 4 ♂, 7 ♀ (*petryi* paralectotypes), Alt. Stolb., e.l. 8–16.vii.1894, e.l. 12–26.vii.1896, e.l. 16.vii.–3.viii.1898 (*Gypsophila fastigiata*) (*Petry*); 3 ♂, 1 ♀, Thüringen, Rotenburg, e.l. 26.vii.1896, e.l. 21–23.vii.1900 (*Gypsophila fastigiata*) (*Petry*) (BMNH). **Switzerland**: 3 ♂, 3 ♀, Zermatt, e.l. vii.1932 (*Weber*) (ETHZ); 1 ♂, Zermatt, 1760 m, e.p. 22.viii.1980 (pupa in leaf-pod of *Gypsophila repens*) (*Whitebread*) (coll. Whitebread, Magden); 2 ♂, 2 ♀, Zermatt, 2000 m, e.l. 14.vii.1932, e.l. viii.1933, e.l. 16.viii.–4.ix.1937 (*Gypsophila repens*) (*Weber*) (BMNH; coll. Burmann, Innsbruck); 2 ♂, 2 ♀, Zermatt, Trift, 2480 m, e.l. 5–14.viii.1984 (larvae 22.vii. on *Gypsophila repens*) (*Whitebread*) (coll. Whitebread, Magden). **Hungary**: 1 ♂, Nyir p. Kecskemét, e.l. 28.vi.1937 (*Gypsophila paniculata*) (*Klimesch*) (coll. Klimesch, Linz). **U.S.S.R.**: 1 ♂, Latviya S.S.R., Skrunda, e.l. 2.vii.1985 (*Gypsophila fastigiata*) (*Sulcs*) (ZM). No locality data: 2 ♂, 1 ♀.

Caryocolum repentella (Chrétien, 1908)

(Figs 31, 113, 179)

Lita repentella Chrétien, 1908*b*: 258. Syntypes, France: Hautes Alpes and Hautes Pyrénées, larvae on *Gypsophila repens*, moths emerged vii–ix (MNHN) [not examined].
Phthorimaea repentella (Chrétien) Meyrick, 1925: 96.
Gnorimoschema repentellum (Chrétien) Klimesch, 1954: 277, figs 7, 8.
Caryocolum repentellum (Chrétien); Hartig, 1964: 41; Sauter, 1983: 116.

Adult (Fig. 31). ♂, 5·0–5·5 mm, ♀, 4·5–5·0 mm. Vertex grey-brown, frons whitish. Second segment of labial palpus white on inner surface, outer surface light to dark brown; third segment dark brown. Thorax and tegula basally dark brown, distal part orange-brown. Fore wing dark brown, orange-brown dorsum scattered with white. Indistinct light triangular patches costad of fold at one-fifth and one-half. White costal and tornal spots separated by orange-brown scales.

Genitalia ♂ (Fig. 113). Transtilla with minute spines. Valva long, slender, evenly tapered, slightly curved. Sacculus digitate, twice as broad as valva, apex pointed. Posterior margin of vinculum with pair of broad, rounded medial processes, lateral processes comparatively long. Saccus long, slender. Anellus with pair of tiny pegs. Aedeagus long, slender, strongly S-curved.

Genitalia ♀ (Fig. 179). Eighth segment without process; two pairs of longitudinal ventrolateral folds; posterior margin emarginated dorsally; apophysis anterior slightly shorter than eighth segment; apophysis posterior 4 times length of anterior. Antrum very broad, funnel-shaped, extending to apices of apophyses anteriores. Posterior part of ductus bursae with a pair of long lateral sclerotizations and two small sclerites. Signum a stout bent hook.

Remarks. *C. repentella* usually differs from similar species in the orange-brown dorsum of the fore wing. In the genitalia it is closely related to *petryi* but differs in the pointed sacculus, the strongly curved aedeagus and the distinctly longer antrum.

L. repentella was described from an unspecified number of specimens bred from larvae collected in the Hautes Alpes and Hautes Pyrénées. I have examined a colour transparency of two syntypes.

Biology. Host-plant: *Gypsophila repens* L.

The larvae have been found between June and August, depending on the altitude of their habitat. They feed between spun shoots, and moths emerge from July to September (Chrétien, 1908*b*: 258).

Distribution. France, Austria.

Additional records. Spain (Agenjo, 1968: [6]); Switzerland, Italy (Klimesch, 1954: 277).

The identity of the *Caryocolum* sp. close to *repentellum* from Mongolia (Povolný, 1973: 18) is uncertain.

Material examined (including 2 ♂, 4 ♀ genitalia preparations)

Austria: 1 ♂, 2 ♀, Tirol, Vennatal, 1400–1500 m, e.l. 6.vii.1948, e.l. 27.vi.–2.vii.1954 (*Gypsophila repens*) (*Burmann; Kappeller*) (coll. Burmann, Innsbruck; coll. Klimesch, Linz); 4 ♂, 5 ♀, Steiermark, Altaussee, 750 m, e.l. 10.vi.1947 (*Gypsophila repens*) (*Klimesch*) (BMNH; coll. Klimesch, Linz; coll. Burmann, Innsbruck).

Caryocolum afghanum **sp. n.**

(Figs 32, 114, 180)

Adult (Fig. 32). ♂, 5·0–5·5 mm, ♀, 4·5–5·0 mm. Head white, vertex sometimes mottled with grey. Labial palpus whitish, outer surface flecked with dark brown; apex of third segment black. Thorax and tegula as

head. Fore wing black mottled with white; white markings mixed with fuscous: along dorsal margin; across wing from fold to costa at one-fifth and one-half. White costal and tornal spots usually confluent, forming a broad fascia.

Genitalia ♂ (Fig. 114). Transtilla weakly sclerotized, without spines. Valva slender, gradually tapered towards apex. Sacculus thumb-shaped, about twice as broad as valva. Posterior margin of vinculum with deep medial incision and pair of shallow lateromedial emarginations resulting in two pairs of short processes; medial pair broad, lateromedial pair small. Saccus short, stout base. Aedeagus short, stout, some minute cornuti at apex; base with small process.

Genitalia ♀ (Fig. 180). Eighth segment without process; longitudinal ventral folds; two pairs of strong lateromedial folds developed; apophysis anterior about length of eighth segment; apophysis posterior about 3 times length of apophysis anterior. Antrum very broad, funnel-shaped, anteriorly fused with pair of tapered lateral sclerotizations which extend beyond apices of apophyses anteriores. Signum a strongly bent, short hook.

Remarks. Externally *C. afghanum* closely resembles *majus*, *abhorrens* and *splendens*. It differs from *majus* in the smaller size, from *abhorrens* in the light colour of the head and thorax. The genitalia differ from those of *splendens* in the straight apex of the valva, the shape of the sacculus and the posterior margin of the vinculum *C. afghanum* is distinguished from *majus* by the shape of the valva and sacculus, the basal process of the aedeagus, the shorter apophyses anteriores and posteriores and the smaller signum. The sometimes similar *leucomelanella* and *schleichi* are easily distinguished by their genitalia.

Biology. Host-plant unknown. Moths have been collected from mid-June to early August from 2100–2500 m.

Distribution. Afghanistan.

Material examined (including 6 ♂, 3 ♀ genitalia preparations)

Holotype ♂, **Afghanistan**: Paghman, 30 km NW. of Kabul, 2200 m, 20–22. vii.1963 (*Kasy & Vartian*) (genitalia slide no. 24399; NM).

Paratypes. **Afghanistan**: 16 ♂, 5 ♀, Paghman, 30 km NW. of Kabul, 2200–2500 m, 29.vi.–8.vii.1963, 20–22.vi.1963, 12.vi–8.viii.1965 (*Kasy & Vartian*) (BMNH; NM); 3 ♂, same data but 2100 m, 20.vii.–9.viii.1962 (*Vartian & Vartian*) (NM).

Caryocolum majus sp. n.

(Figs 33, 115, 181)

Adult (Fig. 33). ♂, ♀, 6·0 mm. Head white, vertex mottled with mid-brown. Labial palpus whitish, flecked with dark brown on outer surface; third segment with black apex. Thorax and tegula whitish mottled with mid-brown. Fore wing black mottled with white; white markings mixed with fuscous: along dorsal margin; fasciae from fold to costa at one-fifth and one-half. White costal and tornal spots usually confluent.

Genitalia ♂ (Fig. 115). Transtilla slightly sclerotized, without spines. Valva broad, linear, rounded apex. Sacculus thumb-shaped, almost twice as broad as valva. Posterior margin of vinculum deeply incised medially, lateromedial emargination shallow; with pair of comparatively slender medial processes and indistinct lateromedial processes. Saccus short, broad base, gradually tapered. Aedeagus stout, very broad apex with some minute cornuti.

Genitalia ♀ (Fig. 181). Eighth segment without process; longitudinal ventral folds, two lateromedial pairs well developed; apophysis anterior about 1·5 times length of eighth segment; apophysis posterior almost 4 times length of anterior. Antrum very broad, funnel-shaped, merged with lateral sclerites of ductus bursae, extended to anterior third of apophysis anterior. Ductus bursae with two tiny posterior sclerites. Signum: broad base and long slender hook.

Remarks. *C. majus* is externally very similar to *splendens* and *afghanum* but differs in its larger size. It is closely related to *afghanum* from which it differs in some genital structures, e.g. the very broad valva, the absence of a basal aedeagus-process, the distinctly longer apophyses anteriores and posteriores and the smaller base of the signum. *C. majus* also resembles *leucomelanella*, *schleichi* and *abhorrens* in fore wing pattern and colour but is distinguished by the genitalia.

Biology. Host-plant unknown. Moths have been collected from mid-June to late July between 1900m and 2200 m.

DISTRIBUTION. Afghanistan.

MATERIAL EXAMINED (including 3 ♂, 1 ♀ genitalia preparations).

Holotype ♂, **Afghanistan**: Paghman, 30 km NW. of Kabul, 2200 m, 20–22.vii.1963 (*Kasy & Vartian*) (genitalia slide no. 13450; NM).

Paratypes. **Afghanistan**: 1 ♂, 1 ♀, same data as holotype (BMNH); 1 ♂, Kabul, SE. of, 1900 m, 18.vi.1965 (*Kasy & Vartian*).

Caryocolum splendens Povolný, 1977

(Figs 34, 116)

Caryocolum splendens Povolný, 1977c: 172, figs 3, 7. Holotype ♂, IRAN (LN) [examined].

ADULT (Fig. 34). ♂, 5·0 mm. Head white, vertex mottled with grey-brown. Second segment of labial palpus white, speckled with light to dark brown on outer surface; third segment dark brown, flecked white. Thorax and tegula white, speckled with mid- to dark brown. Fore wing dark brown mottled with white and light brown; white markings mixed with fuscous: along dorsal margin, indistinct transverse fasciae at one-fifth and middle. White costal and tornal spots at four-fifths confluent, forming a fascia.

GENITALIA ♂ (Fig. 116). Transtilla weakly sclerotized, without spines. Valva slender, digitate, distal part tapered, slightly curved. Sacculus short, thumb-shaped, distoventral part concave. Posterior margin of vinculum with pair of distinct rounded medial processes; pair of lateral processes indistinct, short. Saccus short, gradually tapered, stout base. Aedeagus short, straight, numerous minute cornuti at apex.

GENITALIA ♀. Unknown.

REMARKS. Externally *C. splendens* closely resembles *majus*, *afghanum*, and some other *Caryocolum* species. It differs from *majus* in the smaller size. The genitalia are distinguished from those of *afghanum* by the absence of a basal process of the aedeagus and the shape of the sacculus, from those of *majus* by the more slender, slightly curved valva, the shape of the sacculus and the posterior margin of the vinculum.

C. splendens was described from a single male collected in Iran by Abai.

BIOLOGY. Host-plant unknown. The holotype was collected in early July at 800 m.

DISTRIBUTION. Iran.

MATERIAL EXAMINED (including 1 ♂ genitalia preparation)

Holotype ♂, **Iran**: road Teheran-Qom, Salzsee, S. of Teheran, 800 m, 6.vii.1970 (*Abai*) (genitalia slide no. 5108 Povolný; LN).

Caryocolum species A

(Figs 35, 182)

ADULT (Fig. 35). ♀, 5·0 mm. Head cream. Labial palpus cream; third segment mottled with a few mid-brown scales. Thorax and tegula cream mottled with grey-brown. Fore wing cream, particularly first quarter, middle and dorsum; flecked with light to mid brown, predominantly at base, one-third, two-thirds and at apex. Cream fascia across wing at four-fifths.

GENITALIA ♂. Unknown.

GENITALIA ♀ (Fig. 182). Eighth segment long, without process; strong longitudinal ventromedial folds; apophyses anteriores extremely short, about one-third length of eighth segment. Antrum broad, funnel-shaped, extending almost to apices of apophyses anteriores. Posterior part of ductus bursae with a pair of long lateral sclerotizations. Signum a large, strongly bent hook.

REMARKS. This specimen probably represents an undescribed species but there is insufficient material to determine its true taxonomic status. It differs from the similar *afghanum* and *splendens* by the extension of the cream fore wing markings. The genitalia are characterized by the extremely short apophyses anteriores.

BIOLOGY. Host-plant unknown. The single female was collected in late July.

DISTRIBUTION. Iran.

MATERIAL EXAMINED (including 1 ♀ genitalia preparation)

Iran: 1 ♀, Schahrud, 25.vii.1878 ('*Lita junctella*') (*Christoph*) (genitalia slide no. 24220; BMNH).

GENITALIA ♂. Uncus broad. Transtilla with numerous spines. Valva knife-shaped. Sacculus broad, pointed; distoventral part usually serrated. Posterior margin of vinculum with two pairs of processes: medial pair broad, rounded, lateromedial pair indistinct. Aedeagus slender, apex slightly bent, cornuti present, minute.

GENITALIA ♀. Eighth segment without process; ostium bursae surrounded by indistinct folds. Antrum short. Posterior part of ductus bursae with pair of short to moderately long lateral sclerotizations.

BIOLOGY. Host-plant: Silenoideae (*Silene*); larvae causing galls.

Caryocolum inflativorella (Klimesch, 1938)

(Figs 36–38, 117, 183)

Lita inflativorella Klimesch, 1938: 85, figs 1–3. LECTOTYPE ♂, HUNGARY (coll. Klimesch, Linz), here designated [examined].
[*Bryotropha stramentella* Rebel, 1935: 39 (partim). Misidentification.]
Lita xuthella Rebel, 1940: 4, fig. 6. LECTOTYPE ♂, YUGOSLAVIA (NM), here designated [examined]. **Syn. n.**
Gnorimoschema inflativorella (Klimesch) Klimesch, 1953: 280, figs 25, 26.
Gnorimoschema xuthella (Rebel) Klimesch, 1953: 280, fig. 27.
Gnorimoschema census Gozmány, 1954: 278. Holotype ♂, HUNGARY (TM) [examined]. [Synonymized by Gozmány, 1958: 207.]
Caryocolum inflativorellum (Klimesch) Gozmány, 1958: 207.
Caryocolum xuthellum (Rebel) Klimesch, 1968: 125.

ADULT (Figs 36–38). ♂, 5·5–8·0 mm, ♀, 6·0–7·0 mm. Head yellowish to mid brown. Labial palpus light brown, outer surface of second segment dark brown; third segment black apically. Thorax and tegula as head. Fore wing mottled dark brown with light yellowish brown markings: along dorsal margin, across fore wing at one-fifth and middle. Costal and tornal spots separate, sometimes confluent, forming a narrow fascia or extended towards apex.

GENITALIA ♂ (Fig. 117). Valva broad basally, evenly tapered, straight. Sacculus very broad, pointed, distoventrally serrated. Saccus comparatively broad, length equal to distance from anterior margin of vinculum to apex of valva. Aedeagus moderately short, apex curved.

GENITALIA ♀ (Fig. 183). Ventral zone of eighth segment with folds surrounding ostium bursae; apophysis anterior 1·5 times length of eighth segment. Antrum short, broad, tapered, without anterior emargination. Lateral sclerites of ductus bursae very short. Signum with strongly curved, large hook.

REMARKS. The fore wing pattern of *inflativorella* varies from almost uniformly dark brown to brown with distinct yellowish brown markings. Less variegated specimens are sometimes very similar to unicolorous *amaurella*, *petryi* and *viscariella*. *C. inflativorella* is clearly distinguished from all these species by some genital characters, such as the shape of the sacculus, vinculum and antrum. Externally *inflativorella* usually differs from *amaurella* in the brown rather than black ground colour of the fore wing and the light brown costal and tornal spots. *C. inflativorella* is separated from *viscariella* and the somewhat similar *cauligenella* by the colour of the head and thorax.

Specimens from Yugoslavia are usually more variegated and the yellowish brown fore wing markings are distinct. Such specimens were considered to be a separate species, *C. xuthella*, but their genitalia are indistinguishable from those of typical *inflativorella*. Externally similar specimens are also found within the Hungarian population and it seems unjustified to treat the Yugoslavian form even as a separate subspecies.

L. inflativorella was described from an unspecified number of specimens; one ♂ from the type-series is here designated as lectotype.

L. xuthella was described from an unspecified number of specimens and one of the two ♂ syntypes I have examined is here designated as lectotype.

BIOLOGY. Host-plant: *Silene vulgaris* (Moench) Garcke (Klimesch, 1938: 86).

The larva feeds in June in the stem of the host-plant, causing an internodial gall. It pupates within the feeding-place where it prepares a hole for the emerging adult (Klimesch, 1938: 87). Moths were bred from late June to mid-August.

DISTRIBUTION. Hungary, Yugoslavia (Macedonia), Turkey.

MATERIAL EXAMINED (including 10 ♂, 2 ♀ genitalia preparations)

Lectotype ♂ (*inflativorella*), **Hungary**: Cserkút pr. Pécs, larva 12.vi.1937 in *Silene inflata*-gall, moth emerged 25–29.vii.1937 (*Klimesch*) (coll. Klimesch, Linz). Lectotype ♂ (*xuthella*), **Yugoslavia**: Makedonija ('Mazedonien'), [Ohrid], Petrina [planina], 3–15.viii.1936 (*Wolfschläger*) (genitalia slide no. 13078; NM). Holotype ♂ (*census*), **Hungary**: Budakeszi, Hársbokorh[egy], 31.vii.1952 (*Gozmány*) (genitalia slide no. 86/367 P. Huemer; TM).

Hungary: 5 ♂, 4 ♀ (*inflativorella* paralectotypes), Cserkút p. Pécs, e.l. 10.viii.1936, e.l. 25.vii.–12.viii.1937 (*Silene inflata*) (*Klimesch*) (BMNH; coll. Burmann, Innsbruck); 5 ♂, Pécs ('Pest'), 16–24.viii.1912 (*Peszer*) (BMNH); 1 ♂, Budakeszi, Hársbokorhegy, 9.viii.1952 (*Kovacs*); 1 ♂, Budapest, Ruphegy, 18.vii.1975 e.l. (*Silene inflata*) (*Szöcs*) (TM); 1 ♂, Budakeszi, Hársbokorhegy, 14.viii.1953 (*Gozmány*) (coll. Burmann, Innsbruck). **Yugoslavia**: 1 ♂ (*xuthella* paralectotype), Makedonija ('Macedonia'), Ohrid, e.l. A.viii.1939 (stem-gall of *Silene inflata*) (*Lunak*) (NM). **Turkey**: 1 ♂ (*stramentella* paralectotype), Anatolia c., Akşehir, 1200–1500 m, M.viii.1934 (ZSBS).

Caryocolum saginella (Zeller, 1868)

(Figs 39, 40, 118, 184)

Gelechia saginella Zeller, 1868*a*: 146. LECTOTYPE ♂, ITALY (Friuli) (BMNH), here designated [examined].
Lita saginella (Zeller) Heinemann, 1870: 269; Rebel, 1901: 149.
Lita coussonella Chrétien, 1908*a*: 245. LECTOTYPE ♀, FRANCE (MNHN), here designated [examined]. [Synonymized by Klimesch, 1951: 191.]
Phthorimaea coussonella (Chrétien) Meyrick, 1925: 96; Gaede, 1937: 255.
Phthorimaea (Lita) saginella (Zeller) Meyrick, 1925: 96; Klimesch, 1951: 191, pl. 7, figs 1–6.
Gnorimoschema saginellum (Zeller) Klimesch, 1953: 276, figs 21, 22.
Caryocolum saginella (Zeller) Sattler, 1960*b*: 92.

ADULT (Figs 39, 40). ♂, 4·5–5·0 mm, ♀, 4·0–5·0 mm. Head white. Labial palpus cream to white; first segment dark brown. Thorax white; mesoscutellum apically black. Tegula white with black base. Fore wing black; three white transverse fasciae at one-quarter, one-half and four-fifths, sometimes densely speckled black costad. Dorsal margin white, occasionally flecked dark brown.

GENITALIA ♂ (Fig. 118). Valva broad at base, evenly tapered, apex slightly curved. Sacculus pointed, dorsally rounded, ventrally serrated. Saccus long, slender, 1·2–1·5 times length of distance from anterior margin of vinculum to apex of valva. Aedeagus with slightly curved apex.

GENITALIA ♀ (Fig. 184). Eighth segment with folds surrounding ostium bursae; apophysis anterior about length of eighth segment. Antrum small, anterior margin medially emarginated. Lateral sclerotizations of ductus bursae extending to second third of apophyses anteriores, posteriorly dilated. Signum with short, slender, slightly bent hook.

REMARKS. *C. saginella* varies considerably in the extension of the white fore wing markings. Specimens from Makedonija (Fig. 40) are darker and could be considered a distinct subspecies.

Externally and in genital characters *C. saginella* is very similar to *cauligenella*. It is usually smaller and the markings of the fore wing are variegated black and white. The genitalia are extremely similar to those of *cauligenella*, showing slight differences in the shape of the saccus, which is longer and more slender in *saginella*. Additionally the signa of the female genitalia differ slightly. Due to differences in habitus, distribution and biology, *saginella* and *cauligenella* are here tentatively treated as separate species.

G. saginella was described from an unspecified number of specimens collected near Raibl (Italy: Friuli) by Zeller. I have examined 16 ♂, 12 ♀ syntypes and a male is here designated as lectotype.

L. coussonella was described from an unspecified number of specimens which were bred from *Silene saxifraga*. The type-material was collected in the Basses Alpes by Cousson. I have examined one female syntype which is here designated as lectotype.

BIOLOGY. Host-plants: *Silene saxifraga* L. (incl. *S. hayekiana* Hand-Mazz. & Janchen) (Klimesch, 1951: 191); *S. linoides* (Klimesch, 1968: 124).

Larvae are found in May and June in the shoots, causing terminal galls. Attacked plants become stunted and the distinctly broadened terminal leaves form a bud-like gall. The larva pupates in a web on the ground (Chrétien, 1908*a*: 246; Klimesch, 1951: 192). Moths have been collected from early June to late July. They are frequently found on rock faces.

DISTRIBUTION. France, Italy (Trentino-Alto Adige, Friuli), Yugoslavia.
Additional records. Switzerland (Laquin-valley) (Klimesch, 1953: 38).

MATERIAL EXAMINED (including 4 ♂, 2 ♀ genitalia preparations)
Lectotype ♂ (*saginella*), **Italy**: [Friuli, Raibl,] 15.vii.1867 (Zeller) (BMNH). Lectotype ♀ (*coussonella*), **France**: [Basses Alpes,] larva on *Silene saxifraga*, moth emerged 10.vii.1903 (*Cousson*) (MNHN).
Italy: 15 ♂, 12 ♀ (*saginella* paralectotypes), [Friuli,] Raibl, 18.vi.1867, 15–27.vii.1867 (*Zeller*) (BMNH); 5 ♂, 3 ♀, Trentino-Alto Adige, Lon, vic. Vezzano, e.l. M.vi.1983 (larvae on *Silene saxifraga*) (*Burmann*) (BMNH; coll. Burmann, Innsbruck); 1 ♂, Monte Baldo, 1700 m, 17.vii.1960 (*Burmann*) (coll. Burmann, Innsbruck); 8 ♀, [Alpi Giulie,] Montasio Altiplano, 1600 m, e.l. 10.vii.1950 (larvae 20.vi. on *Silene hayekiana*) (*Klimesch*) (BMNH). **Yugoslavia**: 1 ♂, 1 ♀, Makedonija ('Macedonia'), Ohrid, Petrina planina, e.l. 16, 20.vii.1959 (larvae on *Silene* sp.) (*Klimesch*) (BMNH); 3 ♂, 3 ♀, Makedonija ('Maced. occ.'), Treska ('schlucht') near Skopje, e.l. vi.1960, 12.vi.1956 (larvae on '*Silene linifolia*') (*Kasy*) (NM; coll. Burmann, Innsbruck).

Caryocolum cauligenella (Schmid, 1863)

(Figs 41, 119, 185)

Gelechia cauligenella Schmid, 1863: 73. LECTOTYPE ♂, GERMANY (WEST) (BMNH), here designated [examined].
Lita cauligenella (Schmid) Heinemann, 1870: 268; Benander, 1928: 79, pl. 6, fig. 41; 1941: 43, fig. 2h; Thomann, 1929: 192, pl. 7, figs 4, 5.
Phthorimaea cauligenella (Schmid) Meyrick, 1925: 96; Gaede, 1937: 253.
Gnorimoschema cauligenellum (Schmid) Klimesch, 1953: 275, figs 19, 20.
Caryocolum cauligenellum (Schmid); Hartig, 1964: 42.

ADULT (Fig. 41). ♂, 5·0–6·0 mm, ♀, 4·5–6·0 mm. Head white. Labial palpus cream to white; first segment dark brown; third segment sparingly mottled with dark brown. Thorax white; mesoscutellum apically black. Tegula white with dark brown base. Fore wing dark brown, flecked cream; three indistinct white transverse fasciae at one-quarter, one-half and four-fifths, mottled with light brown. Dorsal margin whitish, scattered brown.

GENITALIA ♂ (Fig. 119). As described under *saginella* (p. 477). Saccus length equal to distance from anterior margin of vinculum to apex of valva.

GENITALIA ♀ (Fig. 185). As described under *saginella* (p. 477). Signum with comparatively long, slender, strongly bent hook.

REMARKS. *C. cauligenella* is very similar to *saginella* in fore wing pattern and genitalia structures. It usually differs in its larger size and the brown rather than black ground colour. The male genitalia are larger and the saccus is usually longer than in *saginella*. The female genitalia are almost indistinguishable and the minute differences in the signum are probably insignificant. However, *cauligenella* and *saginella* are tentatively treated as separate species pending further biological studies (see also Remarks under *saginella*). Externally *C. cauligenella* sometimes resembles *inflativorella* but differs in its white head and thorax.

G. cauligenella was described from an unspecified number of specimens bred by Schmid in 1860. Stainton, according to his diary and correspondence in the BMNH library, received two specimens from Schmid on 15 June 1861. These moths, one male and one female, are almost certainly part of the original series and are now preserved in the BMNH. As I could not trace any other syntypes it seems most appropriate to select one of these specimens as lectotype.

BIOLOGY. Host-plants: *Silene nutans* (Schmid, 1863: 63); *S. otites* (L.) Wibel (Snellen, 1882: 657); *S. vulgaris* (Monech) Garcke (Wörz, 1954: 130); *S. gallica* L., *S. portensis* L., *S. inaptera* L., *S. longicilia* Hoth. (Zerkowitz, 1946: 134).

The larvae feed from April to June in the stems of their host-plant, causing galls. The plants become stunted and are vacated by the mature larvae which pupate on the ground (Schmid, 1863: 63; Schütze, 1931: 88). According to Wörz (1954: 130) hibernation takes place in the larval stage. In the Netherlands the larvae have been found in July (Snellen, 1882: 657). Moths have been collected from June to August.

DISTRIBUTION. Spain, France, West Germany, Poland, Austria, Italy, Greece, Iran.
Additional records. Sweden, Denmark (Klimesch, 1953: 275); Finland (Jalava, 1977: 15); Portugal (Vives Moreno, 1985: 12); Netherlands (Lempke, 1976: 26); Switzerland (Müller-Rutz, 1914: 492);

Czechoslovakia (Hrubý, 1964: 299); Yugoslavia (Klimesch, 1968: 124); Israel (Jerusalem) (Caradja, 1920: 103).

MATERIAL EXAMINED (including 5 ♂, 3 ♀ genitalia preparations)

Lectotype ♂, [**Germany (West)**: Mainz, e.l. 1860] (*Schmid*) (BMNH).

Spain: 1 ♀, Santander, Suances (*Escalera*) (BMNH). **France**: 1 ♂, Lyon, vi.1872 (*Millière*) (BMNH). **Germany (West)**: 1 ♂, Stuttgart, 1884 (*Hofmann*); 5 ♂, Markt Steft, 17.vii.1866 (*Silene nutans*), 1866 (*Hofmann*); 1 ♀ (paralectotype), [Mainz, e.l. 1860] (*Schmid*); 1 ♂, Mainz (*Dietze*); 1 ♂, Mombach near Mainz; 2 ♂, Bavaria (*Staudinger*); 1 ♀, Baden (*Lagen*); 1 ♂, 1 ♀, Unternberg (*Hartmann*) (all BMNH). **Poland**: 3 ♂, 1 ♀, Gdansk ('Danzig'), 2, 4.viii.1871 (BMNH). **Austria**: 1 ♀, Nieder-Österreich ('Austria inf.'), Drosendorf, Julienhöhe, e.l. 28.vii.1948 (*Ortner*) (BMNH); 1 ♂, Tirol ('Teriol sept.'), Umhausen, 20.vii.1945 (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 1 ♂, Südtirol ('Teriolis merid.'), Taufers, 1200 m, 1.x.1980 (*Burmann*) (coll. Burmann, Innsbruck). **Greece**: 1 ♂, Ioannina, Katara Pass, 1600 m, 11.viii.1985 (*Fibiger*) (ZM). **Iran**: 1 ♂, 1 ♀ (BMNH). No locality data: 14 ex.

The *trauniella*-group

ADULT. ♂, ♀. Head, labial palpus and thorax white.

GENITALIA ♂. Uncus broad, slightly narrower than tegumen. Transtilla weakly sclerotized, without spines. Valva long, base broad, tapered towards slightly curved apex. Sacculus short, apex pointed. Posterior margin of vinculum with two pairs of processes; medial process plano-convex, lateral process small, digitate; medial incision deeper than lateromedial semi-elliptical emargination. Saccus long, slender. Aedeagus short, straight, with numerous minute cornuti.

GENITALIA ♀. Eighth segment without process. Ostium bursae surrounded by strong folds. Antrum short, ring-shaped, anterior margin usually straight, sometimes emarginated. Short lateral sclerotizations of ductus bursae fused with antrum.

BIOLOGY. Host-plant unknown.

Caryocolum trauniella (Zeller, 1868)

(Figs 42, 120, 186)

Gelechia trauniella Zeller, 1868*a*: 147. LECTOTYPE ♂, ITALY (Friuli) (BMNH), here designated [examined].

Caryocolum trauniellum (Zeller) Sattler, 1960*b*: 68, 1 fig.

ADULT (Fig. 42). ♂, 6·0 mm, ♀, 6·0–7·0 mm. Head and thorax white. Labial palpus white, third segment mottled with black. Tegula white with black base. Fore wing blackish, with white basal spot; two irregular white fasciae from fold to costa at one-fifth and one-half; dorsal margin dark brown, scattered with grey. White costal and tornal spots at three-quarters confluent, forming a fascia. Hind wing mid-brown.

GENITALIA ♂ (Fig. 120). Sacculus comparatively slender, evenly tapered from base to apex. Entrance of ductus ejaculatorius parallel to longitudinal axis of aedeagus.

GENITALIA ♀ (Fig. 186). Antrum broad, conical, anterior margin without emargination. Lateral sclerotizations of ductus bursae narrow. Corpus bursae spherical. Signum with very large, bent hook.

REMARKS. Externally *C. trauniella* resembles *peregrinella* and *fiorii* but it is distinguished by its blunter fore wings and the darker colour of the hind wings. The male genitalia differ in the shape of the sacculus and the entrance of the ductus ejaculatorius. The female genitalia are characterized by the large signum. *C. trauniella* differs from the somewhat similar *confluens* in the white rather than dark head and thorax and the larger size.

G. trauniella was described from 2 ♂, 2 ♀, all of which I have examined. A male, already labelled 'lectotype' by Sattler, is here designated as such.

BIOLOGY. Host-plant unknown. Moths have been found from late June to mid-July.

DISTRIBUTION. Italy (Friuli).

A record from Hungary (Gozmány, 1958: 230) is most dubious and probably is referable to *Chionodes viduella* (Fabricius). A single male collected in Austria (Lienzer Dolomiten) (Galvagni, 1932: 7) could not be traced. According to Klimesch (1968: 124) *trauniella* has also been found in Yugoslavia. Re-examination of this material has revealed it to be a misidentification of *peregrinella*.

MATERIAL EXAMINED (including 2 ♂, 2 ♀ genitalia preparations)
Lectotype ♂, **Italy**: [Friuli] Raibl, 25.vi.1867 (*Zeller*) (genitalia slide no. 7131; BMNH).
Italy: 1 ♂, 2 ♀ (paratypes), [Friuli] Raibl, 25.vi, 4.vii, 13.vii.1867 (*Zeller*) (BMNH).

Caryocolum peregrinella (Herrich-Schäffer, 1854) **comb. n.**

(Figs 43, 44, 121, 187, 188)

Gelechia peregrinella Herrich-Schäffer, 1854: 166. LECTOTYPE ♀, [type-locality unknown; abdomen missing] (BMNH), here designated [examined].
Gelechia melantypella Mann, 1877: 498. Holotype ♂, ITALY (Südtirol) (NM) [examined]. **Syn. n.**
Caryocolum melantypellum (Mann) Sattler, 1960*a*: 68.
[*Caryocolum trauniellum* (Zeller); Klimesch, 1968: 124. Misidentification.]

ADULT (Figs 43, 44). ♂, 7·5–8·0 mm, ♀, 7·5–9·0 mm. Head and thorax white. Labial palpus white, third segment mottled with dark brown. Tegula white with black base. Fore wing blackish with scattered white scales; small white spot at base; two irregular white transverse fasciae from fold to costa at one-fifth and one-half; medial fascia constricted, usually spread towards costa. Dorsal margin white, scattered with few black scales. Costal and tornal spots white, separated or confluent, forming a fascia, sometimes extended into apex. Hind wing bright nacreous.

GENITALIA ♂ (Fig. 121). Sacculus with broad base, distally tapered. Entrance of ductus ejaculatorius at acute angle to longitudinal axis of aedeagus.

GENITALIA ♀ (Figs 187, 188). Antrum broad, conical, anterior margin emarginated. Lateral sclerotizations of ductus bursae broad. Corpus bursae pyriform. Signum small to medium sized.

REMARKS. *C. peregrinella* closely resembles *trauniella* and *fiorii* in the fore wing pattern. It is distinguished from *trauniella* by the lighter colour of the hind wings, the narrower fore wings and the larger size. The male genitalia show differences in the sacculus and in the angle of the entrance of the ductus ejaculatorius. The female genitalia of *peregrinella* have a much smaller signum than those of *trauniella*. A single female from France (Pelvoux) is characterized by a spherical corpus bursae, a large signum (Fig. 188) and a serrated anterior margin of the antrum. Specimens from this area are also characterized by the more extended white markings of the fore wing (Fig. 44) and could prove to be a separate taxon.

G. peregrinella was described from an unspecified number of specimens collected by Heydenreich. The type-locality is unknown. Herrich-Schäffer received the material together with moths from South Africa and therefore assumed *peregrinella* to be a tropical species. The single type-specimen I have examined is here designated lectotype. Due to the characteristic fore wing pattern there is no doubt about its identity, although the abdomen is missing.

G. melantypella was described from 1 ♂ collected near Carbonin ('Schluderbach'). The type-locality is situated between Dobbiaco and Cortina d'Ampezzo, about 13 km south of Dobbiaco.

BIOLOGY. Host-plant unknown. Klimesch (1968: 124) found the larvae in the middle of June on an unidentified species of Caryophyllaceae. Moths emerged at the end of July. Adults have been caught from mid-July to mid-September.

DISTRIBUTION. France, Italy, Yugoslavia, Greece.

MATERIAL EXAMINED (including 8 ♂, 5 ♀ genitalia preparations)
Lectotype ♀ (*peregrinella*), [loc. typ.?; abdomen missing] (BMNH). Holotype ♂ (*melantypella*), **Italy**: [Südtirol, Dolomites] Carbonin ('Schluderbach') [20.vii.]1876 (*Mann*) (genitalia slide no. 3488; NM).
France: 3 ♂, Basses Alpes, Maurin, 5–23.viii.1932 (*Fassnidge*) (BMNH); 2 ♂, Hautes Alpes, La Bessèe, 1100 m, 12.ix.1960 (*Burmann*) (coll. Burmann, Innsbruck); [?] 1 ♀, Mt Pelvoux, 1850 m, E. viii.1973 (*Zürnbauer*) (TLMF). **Yugoslavia**: 1 ♀, Makedonija, Prespa-Pass, 1600 m, M. viii.1977 (*Zürnbauer*) (TLMF); 1 ♀, Makedonija ('Macedonia'), Petrina Planina, Ohrid ('Ochrid'), 1600 m, 23.viii.1955 (*Kasy*) (NM); 1 ♂, Ohrid, 26.vii.1936 (*Wolfschläger*) (coll. Klimesch, Linz). **Greece**: 1 ♀, Olimbos ('Olymp'), Kataphygion A 1, 2100 m, 12–18.vii.1962 (*Kasy*) (NM); 2 ♂, 1 ♀, Parnassos mts, north of Arakhova, 1900 m, 24.vii.1984 (*Arenberger*) (coll. Arenberger, Wien).

Caryocolum fiorii (Klimesch, 1953) **comb. n.**

(Figs 45, 122)

Gnorimoschema fiorii Klimesch, 1953: 277, figs 23, 24. LECTOTYPE ♂, ITALY, here designated [examined].

ADULT (Fig. 45). ♂, 7·0–7·5 mm. Head white. Labial palpus white, third segment scattered with black. Thorax white. Tegula white, base black. Fore wing blackish brown mottled with light brown. White markings: irregular transverse fasciae at one-fifth and one-half; subcostal spot at about one-third. Dorsal margin grey mottled with light brown. White costal and tornal spots small, separated or confluent, forming a fascia. Hind wing grey.

GENITALIA ♂ (Fig. 122). Sacculus broad, rounded towards pointed apex. Entrance of ductus ejaculatorius at acute angle to longitudinal axis of aedeagus.

GENITALIA ♀. Unknown.

REMARKS. *C. fiorii* differs from the externally similar *peregrinella* in the usually distinct white subcostal spot at one-third, from *trauniella* in the light hind wings and from *interalbicella* in the white thorax.

G. fiorii was described from 5 ♂ collected in Italy. The single male syntype I have examined is here designated lectotype.

BIOLOGY. Host-plant unknown. Moths have been caught in July and early August.

DISTRIBUTION. Switzerland, Italy.

MATERIAL EXAMINED (including 4 ♂ genitalia preparations)

Lectotype ♂, **Italy**: Abruzzo, Gran Sasso, 25.vii.1935 (*Fiori*) (genitalia slide no. 516 Klimesch; coll. Klimesch, Linz).

Switzerland: 2 ♂, Saas Fee, 19–31.vii.1908 (*Chapman*) (BMNH). **Italy**: 1 ♂, Gran Sasso, 7000 ft, 19.vii.1959 (BMNH).

The *provinciella*-group

Characters as described under *provinciella*.

Caryocolum provinciella (Stainton, 1869)

(Figs 46, 123, 189, 190)

Gelechia provinciella Stainton, 1869: 221. LECTOTYPE ♂, FRANCE (BMNH), here designated [examined].
Lita provinciella (Stainton) Rebel, 1901: 149.
Phthorimaea provinciella (Stainton) Meyrick, 1925: 96; Gaede, 1937: 282.
Gnorimoschema provinciellum (Stainton) Klimesch, 1954: 279, figs 11, 12.
Caryocolum provinciellum (Stainton); Povolný, 1980: 198.
Caryocolum provinciella (Stainton); Klimesch, 1984: 159, figs 56, 57.

ADULT (Fig. 46). ♂, ♀, 5·0–6·0 mm. Head light brown; frons dark grey, dark brown along margin of eye from base of proboscis to antenna. Second segment of labial palpus white on inner surface, outer surface dark brown, whitish apex; third segment mottled mid-brown. Thorax and tegula light brown flecked dark brown. Fore wing mid- to dark brown; dorsal margin light brown with scattered white scales; two indistinct whitish patches across fold at one-fifth and middle, black spots in between and distad. Costal and tornal spots indistinct, separate.

GENITALIA ♂ (Fig. 123). Transtilla weakly sclerotized, without spines. Valva broad at base, evenly tapered towards slender distal part. Sacculus semiovate, ventral margin straight, dorsal margin convex. Posterior margin of vinculum with deep U-shaped, slightly asymmetrical emargination; pair of small lateral processes present. Saccus stout, gradually tapered towards slender distal part. Anellus with pair of long, needle-shaped sclerites. Aedeagus short, stout, apex slightly curved with large sclerotized apical arm and numerous minute cornuti.

GENITALIA ♀ (Figs 189, 190). Eighth segment without process; distinct, posteriorly rounded, ventral sclerotization with strong lateral folds; two further folds branching off towards antrum. Antrum ring-shaped with posterior margin sinuate. Posterior part of ductus bursae with pair of short, broad ventro-lateral sclerites, fused with antrum. Corpus bursae spinous around signum. Signum a large base and strong hook with basal teeth.

REMARKS. *C. provinciella* is very similar to *marmoreum* and *sciurella* in the fore wing pattern but usually differs in the dark face. The male and female genitalia are distinguished from both species by structures such as the shape of the valva, sacculus, antrum and signum.

G. provinciella was described from an unspecified number of specimens. I have examined 5 ♂, 4 ♀ syntypes; a single male, already labelled 'lectotype' by Sattler, is here designated as such.

Biology. Host-plants: *Silene nicaensis* All. (Stainton, 1869: 221); *Herniaria* L. (coll. Walsingham).

The larvae are found along sandy coasts, living in sand tubes at the base of the food-plant and feeding on the young shoots before pupating in sand-cocoons. The moths emerged from early April to beginning of May (Stainton, 1869: 221). Lhomme ([1946]: 627) recorded *provinciella* as bivoltine with larvae from September to March and in June, and adults in April-May and August.

Distribution. France, Morocco.

Additional record. Spain (Vives Moreno, 1985: 12).

Material examined (including 4 ♂, 1 ♀, genitalia preparations)

Lectotype ♂, **France**: Cannes, larva 28.ii.1867, on *Silene nicaensis*, moth emerged 8.iv.1867 (*Stainton*) (BMNH).

France: 4 ♂, 4 ♀ (paralectotypes), same data as lectotype, moths emerged 10.iv.–1.v.1867 (*Stainton*) (BMNH); 1 ♀, Cannes (*Millière*); 2 ♂, Cannes, La Bocca, iv.1881, 28.iv.1890 (*Walsingham*) (BMNH). **Morocco**: 2 ♂, 2 ♀, Tanger ('Tangier'), moths emerged 18.iv.–4.v.1902 (larvae in iii. on *Herniaria*) (*Walsingham*) (BMNH).

The *mucronatella*-group

Genitalia ♂. Uncus broad. Transtilla weakly sclerotized, without spines. Valva short, broad at base, evenly tapered distally. Sacculus broad, pointed. Posterior margin of vinculum with narrow medial and deep lateromedial emarginations resulting in two pairs of distinct processes. Saccus long, slender. Aedeagus long, slender, numerous minute apical cornuti.

Genitalia ♀. As described under *mucronatella*.

Biology. Host-plant: Alsinoideae (*Minuartia*).

Caryocolum mucronatella (Chrétien, 1900)

(Figs 47, 48, 124, 191, 192)

Lita mucronatella Chrétien, 1900: 138. LECTOTYPE ♂, France (MNHN), here designated [examined].
[*Lita leucomelanella* (Zeller); Schmid, 1885: 132 (partim).]
Phthorimaea mucronatella (Chrétien) Meyrick, 1925: 96.
Lita poschiavensis Rebel, 1936*b*: 2, pl. 1, fig. 5. LECTOTYPE ♂, Switzerland (NM), here designated [examined]. **Syn. n.**
Lita boschiavensis Rebel; Rebel, 1936*a*: 95. [Incorrect subsequent spelling of *poschiavensis* Rebel.]
Phthorimaea poschiavensis (Rebel) Gaede, 1937: 281.
Lita poschiavensis Rebel; Burmann, 1949: 70.
Gnorimoschema poschiavense (Rebel) Klimesch, 1953: 316, figs 40, 41. [Unjustified emendation of *poschiavensis* Rebel.]
Gnorimoschema mucronatellum (Chrétien) Klimesch, 1954: 274, fig. 1.
Caryocolum poschiavense (Rebel); Hartig, 1964: 41.
Caryocolum mucronatella (Chrétien); Agenjo, 1968: [6].

Adult (Figs 47, 48). ♂, 4·5–5·5 mm, ♀, 4·0–5·5 mm. Head mid-brown to dark grey-brown; frons whitish. Second segment of labial palpus sallow on inner surface, light to mid-brown on outer surface; third segment black flecked with white. Thorax and tegula dark brown, distal part orange-brown. Fore wing dark brown to black, basally mottled with orange-brown; dorsal margin grey-brown, occasionally speckled with orange-brown; two greyish-white fasciae from fold to costa at one-fifth and one-half, sometimes mixed with orange-brown, distal fascia frequently dilated towards white medial patch, often pure white patch. White costal and tornal spots separate.

Genitalia ♂ (Fig. 124). Valva broad at base, distal part slender, evenly tapered. Sacculus pointed, distal part ventrally concave, dorsally convex. Anellus with pair of small pegs.

Genitalia ♀ (Figs 191, 192). Eighth segment without process; distinct folds surrounding ostium bursae, converging towards posterior margin of eighth segment. Antrum short with pair of lateral folds. Ductus bursae with pair of long lateral sclerotizations, extending to apices of apophyses anteriores. Signum with big sickle-shaped base and strongly bent hook.

REMARKS. *C. mucronatella* exhibits remarkable variation, both externally and in genitalia. The fore wing markings range from variegated to almost completely covered with dark scales and thus nearly unicolorous. The females are usually smaller and more variegated than the males. The male genitalia vary in the shape of the valva, which is basally broader in specimens from southern Europe, whilst the aedeagus is usually longer in specimens from northern parts. The female genitalia vary in the length of the antrum (Figs 189, 190).

C. mucronatella is externally similar to *leucomelanella*, *schleichi*, *vicinella*, *bosalella* and *fibigerium*. It may be distinguished from *fibigerium* by the lighter thorax and differs from the other species in characters of the genitalia such as the shape of the valva, sacculus and signum. *C. mucronatella* differs from the closely related *simulans* in the distinctly narrower sacculus which is not medially broader.

L. mucronatella was described from an unspecified number of specimens bred from larvae which were collected in the Hautes Alpes. I have examined two male syntypes, one of which is here designated lectotype.

L. poschiavensis was described from an unspecified number of specimens collected in Switzerland by Thomann. I have examined 2 ♂, 1 ♀ syntypes and designate one male as lectotype.

BIOLOGY. Host-plants: *Minuartia mutabilis* Schinz & Thell. ex Becherer (= *M. rostrata* (Pers.) Reichenb.) (Lhomme, [1946]: 630); *M. setacea* (Thuill.) Hayek (Schmid, 1885: 132); *M. verna attica* (Boiss. & Spruner) Hayek (coll. Klimesch); *M. laricifolia* (L.) Schinz & Thell. (Burmann, 1949: 71).

The larva occurs from late May to mid-July depending on the altitude of the habitat. It lives in silken webs which are extended from the root-stock to the terminal parts of the host-plant and feeds on the leaves (Schmid, 1885: 132; Burmann, 1949: 71). Moths have been caught from the end of June to late August in mountainous areas up to an altitude of 2400 m.

DISTRIBUTION. Spain, France, West Germany, Switzerland, Austria, Italy, Greece, Turkey.

MATERIAL EXAMINED (including 21 ♂, 6 ♀ genitalia preparations)

Lectotype ♂ (*mucronatella*), **France**: [Hautes Alpes,] moth emerged 8.viii.1899 ('*als. mucr.*') (genitalia slide no. 528a Klimesch; MNHN). Lectotype ♂ (*poschiavensis*), **Switzerland**: [Graubünden, Puschlavertal, Brusio,] Campascio, moth emerged 18.vii.1935 (*Alsine laricifolia*) (*Thomann*) (NM).

Spain: 22 ♂, 11 ♀, Granada, Sierra Nevada, Road to Veleta, 2000–2300 m, 17–25.vii.1962, 17–25.vii.1969 (*Sattler; Sattler & Carter*) (BMNH); 1 ♂, Sierra Nevada, Cam. del Veleta, 2300 m, 19.viii.1984 (*Traugott-Olsen*) (coll. Traugott-Olsen, Marbella). **France**: 1 ♂ (*mucronatella* paralectotype), [Hautes Alpes,] e.l. 8.viii.1899 (MNHN); 1 ♂, 3 ♀, Alpes-Maritimes, Peira-Cava, 4800 ft, 8–29.viii.1911 (*Walsingham*) (BMNH). **Germany (West)**: 1 ♂, 1 ♀, [? Bavaria, Kelheim]; 3 ♂, 1 ♀, Kelheim, e.l. (BMNH). **Switzerland**: 1 ♂, 1 ♀ (*poschiavensis* paralectotypes), Campascio, e.l. 14–20.vii.1935 (*Thomann*) (NM). **Austria**: 1 ♀, Tirol, Umhausen, e.l. 7.vii.1947 (*Alsine laricifolia*) (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 2 ♂, Trentino-Alto Adige, Pietramurata, 12–14.viii.1958, 2–6.viii.1959 (*Burmann*) (coll. Burmann, Innsbruck). **Greece**: 2 ♂, Ioannina, Katara Pass, 1600 m, 11.viii.1985 (*Fibiger*); 1 ♂, Achaia, Mt Chelmos, 1600 m, 27.vi.1983 (*Skule*) (ZM); 2 ♂, 4 ♀, Mt Chelmos, 2300–2400 m, e.l. 1–10.viii.1963 (larvae 10.vii. on *Minuartia verna attica*) (*Klimesch*) (coll. Klimesch, Linz); 2 ♂, Lakonia, Parnon Oros, 1700 m, 15.vii.1980 (*Skule*) (ZM); 6 ♂, 1 ♀, Parnassos, north of Arakhova, 1900 m, 24.vii.1984 (*Arenberger*) (coll. Arenberger, Wien; ZM; BMNH). **Turkey**: 1 ♀, Kayseri, Bünyon, 8.vii.1969 (*Tremewan & Cottrill*) (BMNH).

Caryocolum simulans sp. n.

(Figs 49, 125)

ADULT (Fig. 49). ♂, 5·0–6·0 mm. Head cream to whitish. Labial palpus cream, second segment mottled with light brown on outer surface, third segment speckled with dark brown. Thorax and tegula cream mixed with brown. Fore wing dark brown mottled with cream at base; dorsal margin cream speckled with mid-brown; two cream fasciae from fold to costa at one-fifth and one-half, frequently mottled with brown. Cream costal and tornal spots usually separate.

GENITALIA ♂ (Fig. 125). Valva broad at base, distal part slender, evenly tapered. Sacculus distinctly broadened medially, apex pointed. Anellus with pair of small pegs.

GENITALIA ♀. Unknown.

REMARKS. *C. simulans* closely resembles *splendens* externally but is usually slightly larger and the fore wing colour is darker. The male genitalia differ from those of *mucronatella* in the distinctly broadened medial part of the sacculus.

The type-specimens were caught at Shar Deresy, a locality which is either north or south of the present Turkish/Syrian border. This problem was discussed in detail by Sattler (1979: 286). The holotype bears the registration number 'Leech coll. 61651'.

Biology. Host-plant unknown.

Distribution. Syria.

Material examined (including 3 ♂ genitalia preparations)
Holotype ♂, **Syria**: [Haleb,] Shar Deresy ('Shar Devesy'), 1893 (*native collector*) (Genitalia slide no. 24400; BMNH).
Paratypes. 7 ♂, same data as holotype.

The *leucomelanella*-group

Genitalia ♂. Culcitula large. Transtilla well sclerotized, without spines. Valva broad, distal part with one or two processes. Sacculus shorter than valva, knife-shaped. Posterior margin of vinculum with deep medial incision and pair of deep lateromedial emarginations resulting in two pairs of distinct digitate processes. Aedeagus short, stout, with numerous minute cornuti at apex.

Genitalia ♀. Eighth segment without process; ostium bursae surrounded by distinct folds which join together at about middle of eighth segment. Antrum short, conical, anteriorly indented. Ductus bursae with long lateral sclerotizations.

Biology. Host-plants: Silenoideae (*Petrorhagia, Dianthus*).

Caryocolum abhorrens sp. n.

(Figs 50, 126)

Adult (Fig. 50). ♂, 5·0 mm. Head greyish brown; frons white. Second segment of labial palpus white mottled with dark brown on outer surface; third segment blackish. Thorax and tegula grey-brown, flecked with light grey. Fore wing blackish mottled with grey; indistinct whitish markings mottled with grey; spot near base, fasciae across wing at one-fifth and middle; dorsal margin greyish white. White costal and tornal spots confluent, forming a narrow fascia.

Genitalia ♂ (Fig. 126). Valva broad at base, distal part abruptly tapered. Sacculus extended almost beyond valva, knife-shaped, medial part broadened, apex pointed. Posterior margin of vinculum with deep broad emargination, two pairs of processes present. Saccus stout, long. Aedeagus long, slender, minute cornuti at apex.

Genitalia ♀. Unknown.

Remarks. *C. abhorrens* closely resembles *leucomelanella*, *immixtum*, *schleichi*, *splendens* and other species externally. It differs from *splendens* in the darker colour of the head and thorax and is best recognized by characters of the genitalia such as the shape of the valva, sacculus and vinculum.

Biology. Host-plant unknown. The holotype was caught at the end of June at 2300 m.

Distribution. Afghanistan.

Material examined (including 1 ♂ genitalia preparation)
Holotype ♂, **Afghanistan**: 40 km SW. of Kabul, 2300 m, 29.vi.1965 (*Kasy & Vartian*) (genitalia slide no. 13454; NM).

Caryocolum leucomelanella (Zeller, 1839)

(Figs 51, 127, 193)

Gelechia leucomelanella Zeller, 1839: 198. LECTOTYPE ♀, Poland (BMNH), here designated [examined].
Gelechia gypsophilae Stainton, 1869: 210, fig. LECTOTYPE ♂, France (BMNH), here designated [examined]. **Syn. n.**
Lita leucomelanella (Zeller); Heinemann, 1870: 270; Benander, 1928: 80, pl. 6, fig. 44.
Phthorimaea leucomelanella (Zeller) Meyrick, 1925: 96 (partim).
Lita gypsophilae (Stainton); Burmann, 1949: 68.

Gnorimoschema leucomelanellum (Zeller) Klimesch, 1953: 229, figs 1–4.
Gnorimoschema gypsophilae (Stainton) Klimesch, 1953: 233, figs 5, 6.
Caryocolum leucomelanellum (Zeller) Gozmány, 1958: 207.
Caryocolum gypsophilae (Stainton); Hartig, 1964: 41.

ADULT (Fig. 51). ♂, 3·5–5·0 mm, ♀, 4·0–5·5 mm. Frons ochreous whitish, vertex speckled with dark brown. Outer surface of labial palpus dark brown to black, inner surface whitish ochreous; third segment blackish with a few light scales. Thorax light ochreous with black and brown scales, with pair of dark lateral spots and dark apex of mesoscutellum. Tegula whitish brown with black base. Abdomen light grey on ventral surface. Fore wing blackish; orange-brown subcostal streak near base; white markings: transverse fascia from fold to costa at one-fifth and indistinct medial spot; dorsal margin with scattered greyish white scales. White costal and tornal spots at four-fifths usually separate.

GENITALIA ♂ (Fig. 127). Valva distally rounded; long digitate process present. Sacculus pointed. Saccus 2·0–2·5 times length of vinculum.

GENITALIA ♀ (Fig. 193). Eighth segment with strong folds surrounding ostium bursae; apophysis anterior twice as long as eighth segment; apophyses posteriores 3·5–4·0 times length of anteriores. Lateral sclerotizations of ductus bursae almost extending to apices of apophyses anteriores. Signum a large hook.

REMARKS. *C. leucomelanella* closely resembles *schleichi*, *vicinella*, *mucronatella* and *abhorrens* in the fore wing pattern and colour. It usually differs from these species in the presence of many orange-brown subcostal scales near the base. *C. leucomelanella* is further distinguished from *schleichi* by the light grey rather than dark brown ventrum of the abdomen. Dissection of the genitalia is, however, frequently necessary to confirm the identification. The genitalia are easily distinguished from those of other *Caryocolum* species, particularly by the shape of the valva, the folds of the female eighth segment and the shape of the antrum. *C. leucomelanella* is closely related to *immixtum* and *leucothoracellum* but differs in the shape of the valva, the length of the saccus and the lateral sclerotizations of the ductus bursae.

G. leucomelanella was described from an unspecified number of specimens collected near Glogów. A female, already labelled 'lectotype' by Sattler, is here designated as such.

G. gypsophilae was described from an unspecified number of specimens bred from '*Gypsophila saxifraga*'. A single male is here designated lectotype.

I have found no differences between *leucomelanella* and *gypsophilae*, both externally and in genital structures, and therefore I treat them as conspecific (see also Biology).

Gaede (1937: 268) erroneously synonymized *Lita affiniella* Zetterstedt, 1839 with *leucomelanella*. The former is conspecific with *Aroga velocella* (Duponchel) as shown by Benander (1940: 59).

BIOLOGY. Host-plants: *Petrorhagia saxifraga* (L.) Link ('*Tunica saxifraga*'); *Dianthus carthusianorum* L. (Klimesch, 1953: 230); *Dianthus sylvestris* Wulfen (Whitebread, *in litt.*). Pröse (1979: 66) suspects the larva to feed on *Dianthus gratianopolitanus* Vill. and *D. seguieri* Vill. in Oberfranken (West Germany).

All records of *leucomelanella* on *Silene* (Stainton, 1867: 61 and others) are erroneous and apply to *vicinella*.

1. *C. gypsophilae*. The larva has been described by Stainton (1869: 210) who discovered it in southern France at the end of March, feeding in small stem-galls of *Petrorhagia saxifraga*. Shoots of the food-plant become stunted and the galls are vacated in the middle of April when the larva feeds sparingly on young shoots before it pupates in a cocoon on the ground at the end of April. In the northern part of its range (Tyrol) the larva has been discovered at the beginning of May and moths emerged after three weeks (Burmann, 1949: 69).

2. *C. leucomelanella*. The larva has been found from late May until June feeding in shoots of *Dianthus* (Klimesch, 1953: 233). According to Whitebread (pers. comm.) it also bores in the stem and this shows that there is no fundamental difference in the life-history of both host-races. It is therefore not surprising that the larval feeding causes galls in the thinner *Petrorhagia*-stems.

DISTRIBUTION. Spain, Andorra, France, East Germany, Poland, Switzerland, Austria, Italy, Yugoslavia, Albania, Greece.

Additional records. West Germany (Pröse, 1979: 66); Czechoslovakia (Klimesch, 1953: 230); U.S.S.R. (European part) (Piskunov, 1981: 686).

Records of *leucomelanella* from Great Britain and northern Europe are misidentifications of *vicinella*.

MATERIAL EXAMINED (including 12 ♂, 8 ♀ genitalia preparations)

Lectotype ♀ (*leucomelanella*), **Poland**: Silesia, Glogów ('Glogau') (*Zeller*) (genitalia slide no. 7137) (BMNH). Lectotype ♂ (*gypsophilae*), **France**: [Alpes-Maritimes,] Mentone, larva on *Gypsophila [saxifraga]*, moth emerged 8.vi.1866 (*Stainton*) (BMNH).

Spain: 1 ♂, Albarracin, ix (*Schmidt*) (TM). **Andorra**: 1 ♂, Seturia, L'Espeluga, 2200 m, 27.vii.1981 (*Sattler, Tuck, Robinson*) (BMNH). **France**: 3 ♂, 9 ♀ (*gypsophilae* paralectotypes), Mentone, larvae on *Gypsophila saxifraga*, moths emerged 3–17.vi.1866 (*Stainton*); 6 ♂, 5 ♀, Mentone, e.l. 19.v.–9.vi.1867 (*Stainton*); 1 ♂, 1 ♀, Mentone 1889; 15 ♂, 9 ♀, Cannes, La Bocca, e.l. 24–28.vi.1890 (larvae 6.v. in *Gypsophila saxifraga* galls) (*Walsingham*); 4 ♂, 3 ♀, Cannes, e.l. 19–23.v.1892 (larvae in *Gypsophila saxifraga* galls) (*Walsingham*); 6 ♂, 4 ♀, Alpes-Maritimes, Golfe Juan, 12–24.vi.1894 (*Constant*) (BMNH); 1 ♂, Alpes-Maritimes, Peira-Cava, 4800 ft, 27.viii.1911 (Walsingham); 1 ♂, Hautes Alpes, La Bessèe, 1100 m, 6–10.vi.1959 (*Glaser*) (only genitalia slide examined) (LN). **Germany (East)**: 1 ♂, Bad Blankenburg, M.k. Gleitz, 28.viii.1984 (*Steuer*) (coll. Steuer, Bad Blankenburg); 1 ♂, Lausitz (ZM). **Poland**: 2 ♂ (*leucomelanella* paralectotypes), Glogów ('Glogau') (*Zeller*) (BMNH). **Switzerland**: 1 ♂, GR, Soglio, 1120 m, 23.viii.1981 (*Whitebread*); 1 ♀, VS, Martigny-Rosel, 460 m, moth emerged 30.vi.1983 (larva 25.v. 'mining' in stem of *Dianthus*) (*Whitebread*) (coll. Whitebread, Magden). **Austria**: 1 ♂, 2 ♀, Tirol, Innsbruck, 600 m, 24.vii.1968, e.l. vi.1961 (larvae on *Tunica saxifraga*) (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 2 ♂, Südtirol, Schnalstal, 800 m, ix.1971, viii.1974 (*Zürnbauer*) (TLMF). **Yugoslavia**: 1 ♂, Makedonija, Ohrid, 700 m, viii.1969 (*Zürnbauer*) (TLMF); 1 ♂, Makedonija, Ohrid, Mt Asan Djura, 1000 m, 4.viii.1979 (*Baldizzone*) (coll. Baldizzone, Asti). **Albania**: 1 ♂, Uji Ftohte, S. of Tepelena, 200 m (MNHU). **Greece**: 2 ♂, Drama, Mt Phalakron, Volas, 1000 m, 18.viii.1985 (*Fibiger*); 2 ♂, 1 ex. Lakonia, Mt Taygetos, 1000 m, 28–29.vi.1982 (*Skule & Langemark*) (ZM); 1 ♂, Makedonija, Kastoria, 2.viii.1979 (*Baldizzone*) (coll. Baldizzone, Asti); 1 ♀, Olimbos ('Olymp'), Karia, 800 m, 15.vii.1974 (*Arenberger*) (coll. Arenberger, Wien).

Caryocolum immixtum sp. n.

(Figs 52, 128, 194)

Adult (Fig. 52). ♂, 5·0 mm, ♀, 4·5 mm. Head grey-brown; frons whitish. Second segment of labial palpus light brown on outer surface, inner surface white; third segment black flecked with white. Thorax whitish brown. Tegula with dark base, whitish medial part and mid brown distal part. Fore wing dark brown, scattered with white; indistinct white markings, frequently speckled with grey: fasciae from fold to costa at one-fifth and middle, the latter occasionally with distinct white medial spot; dorsal margin mottled with grey and white. White costal and tornal spots usually separate.

Genitalia ♂ (Fig. 128). Valva broad, with rounded apex, short digitate process distally. Sacculus pointed. Saccus very long, slender, reaching about 4 times length of vinculum.

Genitalia ♀ (Fig. 194). Eighth segment with strong folds surrounding ostium bursae, apophysis anterior slightly longer than eighth segment; apophyses posteriores 3·5–4·0 times length of anteriores. Posterior part of ductus bursae with long lateral sclerotizations extending beyond apices of apophyses anteriores. Signum a large hook.

Remarks. *C. immixtum* closely resembles *schleichi* and *leucomelanella* in fore wing pattern and colour. It may be distinguished from the former by genital characters such as the shape of the valva and the extremely long lateral sclerites of the ductus bursae, a feature by which *immixtum* also differs from *leucomelanella*. The male genitalia differ from those of *leucomelanella* in the short process of the valva and the distinctly longer saccus.

Biology. Host-plant unknown. Moths have been collected from late May to late June.

Distribution. Afghanistan.

Material examined (including 4 ♂, 2 ♀ genitalia preparations)

Holotype ♂, **Afghanistan**: Khurd-Kabul, SE. of Kabul, 1900 m, 18.vi.1965 (*Kasy & Vartian*) (genitalia slide no. 24303; BMNH).

Paratypes. 4 ♂, 2 ♀, same data as holotype but 26.v., 18, 26.vi.1965 (NM; BMNH).

Caryocolum leucothoracellum (Klimesch, 1953)

(Figs 53, 129, 195)

Gnorimoschema leucothoracellum Klimesch, 1953: 233, figs 7–9. LECTOTYPE ♀, Austria (coll. Klimesch, Linz), here designated [examined].

Caryocolum leucothoracellum (Klimesch) Gozmány, 1958: 203; Hartig, 1964: 41.

Adult (Fig. 53). ♂, 4·0–5·0 mm, ♀, 4·5–6·0 mm. Head white. Labial palpus white, scattered with black on outer surface; third segment with black collar. Patagia dark brown. Thorax white; tegula white with

black base. Fore wing dark brown; white subcostal streak near base turning towards fold at one-fifth; white medial spot; dorsal margin whitish mottled with grey. White costal and tornal spots separate or rarely confluent, forming a fascia.

GENITALIA ♂ (Fig. 129). Valva broad, with short hump and long digitate process distally. Saccus slender, 2·0–2·5 times length of vinculum.

GENITALIA ♀ (Fig. 195). Eighth segment with strong folds surrounding ostium bursae; apophysis anterior about 1·5 times length of segment; apophysis posterior 4 times length of anterior. Posterior part of ductus bursae with pair of moderately short lateral sclerotizations extending beyond middle of apophyses anteriores. Signum a small hook.

REMARKS. *C. leucothoracellum* is characterized by the white head and thorax. It also differs from related species in genital characters such as the shape of the valva, the length of the lateral sclerotizations of the ductus bursae and the small signum hook.

G. leucothoracellum was described from 5 ♂, 4 ♀ collected in Austria (Nieder-Österreich) and Italy (Südtirol). A female was labelled holotype by Klimesch but no formal holotype designation was made in the original description; this specimen is here designated lectotype. One specimen caught at the type-locality on 12.viii.1939 and labelled as paratype by Klimesch is included in the type-series, although the date of capture is not mentioned in the original description.

BIOLOGY. Host-plant unknown. Moths have been collected from late June to late October. However, this species appears to be univoltine.

DISTRIBUTION. France, Italy, Austria, Hungary.

Additional record. Morocco: 1 ♂, Ifrane, 7.ix.1955 (coll. Buckwell) (genitalia slide no. 164b, Sattler). This specimen has been examined by Klimesch and Sattler (Sattler, pers. comm.).

MATERIAL EXAMINED (including 5 ♂, 4 ♀ genitalia preparations)

Lectotype ♀, **Austria**: Nieder-Österreich ('Austria inf.'), Dürnstein, 14.viii.1936 (*Klimesch*) (coll. Klimesch, Linz).

France: 1 ♀, Alpes-Maritimes, Peira-Cava, 4800 ft, 1.ix.1911 (*Walsingham*) (BMNH); 1 ♀, Prelles, 1200 m, E. viii.1973 (*Zürnbauer*) (TLMF); 1 ♂, Hautes Alpes, La Bessée, 1100 m, 12.ix.1960 (*Burmann*) (coll. Burmann, Innsbruck). **Austria**: 1 ♂ (paralectotype), Nieder-Österreich, Dürnstein, 12.viii.1939 (*Klimesch*) (coll. Klimesch, Linz). **Hungary**: 1 ♂, 1 ♀, Budakeszi, Hársbokorhegy, 21.viii.1952, 14.viii.1953 (*Gozmány*) (coll. Burmann, Innsbruck). **Italy**: 1 ♀, Südtirol, Vinschgau, Naturns, 500 m, 1–5.x.1983 (*Skule & Skou*) (ZM); 1 ♀, Südtirol, Laatsch, 1000 m, 19.viii.1972 (*Burmann*); 1 ♂, Südtirol, Taufers, 1300 m, 6.viii.1977 (*Burmann*); 1 ♂, Trentino-Alto Adige, Villamontagna, 600 m, 17.viii.1982 (*Burmann*); 3 ♂, Trentino-Alto Adige, Pietramurata, 21–23.ix.1958, M. viii.1960, M. viii.1967 (*Burmann, Zürnbauer*); 1 ♂, 1 ♀, Verona, Monte, 300 m, 21.viii., 24.x.1984 (*Burmann & Tarmann*); 1 ♀, Val Nervia, Dolceaqua, 150 m, 22.ix.1960 (*Burmann*); 2 ♂, 2 ♀, Lago di Garda, Pai, 100 m, 26.viii.–1.ix.1962, E. viii., E. ix.1962, E. vi.1968 (*Burmann, Zürnbauer*) (coll. Burmann, Innsbruck; TLMF).

Caryocolum schleichi (Christoph, 1872)

(Figs 54–58, 130–133, 196–199)

Lita schleichi Christoph, 1872: 22, pl. 1, fig. 19.

ADULT (Figs 54–58). ♂, 4·0–6·0 (7·0) mm, ♀, 3·5–6·0 mm. Head blackish brown to white; frons whitish. Labial palpus whitish; second segment mottled with dark brown on outer surface; third segment blackish, speckled with white. Thorax and tegula dark brown flecked with white to almost unicolorous white. Tegula cream, whitish apically. Abdomen dark brown on ventral surface. Fore wing dark brown, mottled with greyish white along costa and dorsal margin. White markings: basal spot; transverse fasciae from fold to costa at one-fifth; medial fascia reduced to distinct spot, occasionally extended towards costa and dorsal margin. White costal and tornal spots usually separate.

GENITALIA ♂ (Figs 130–133). Uncus with dorsal hump. Valva broadened distally, apex with two processes. Sacculus short, knife-shaped. Saccus long, slender. Aedeagus long, slightly bent, apex with numerous minute cornuti.

GENITALIA ♀ (Figs 196–199). Eighth segment dorsally with deeply emarginate anterior margin; ventral zone with pair of narrow folds from antrum converging posteriorly. Antrum short, tubular. Posterior part of ductus bursae with pair of long lateral sclerotizations, extending to apices of apophyses anteriores. Signum a slender hook.

Remarks. *C. schleichi* shows considerable individual and geographical variation externally as well as in genital structures. The colour of the head and thorax varies from white in the eastern and south-western part of its distribution to almost black in northern Europe. The fore wing pattern varies individually: it usually includes a white streak from fold to costa at one-fifth, a distinctive white medial spot and separated costal and tornal spots at four-fifths. These markings are sometimes extended, forming three white transverse fasciae, or reduced to a small streak near the base, a small medial and small costal and tornal spots. Specimens from northern Europe are usually darker than those of southern populations.

The male genitalia vary particularly in the shape of the valva. Specimens from southern and eastern Europe are characterized by two short apical processes, whereas these are elongated in the Alpine and Scandinavian populations. Moths from Spain and Morocco are characterized by an additional hump on the distal part of the valva. No geographical variation has been found in the female genitalia.

C. schleichi closely resembles *leucomelanella*, *vicinella* and *bosalella* externally. It differs externally in the dark rather than light ventrum of the abdomen and in genitalia in the shape of the valva and the ventral folds of the eighth female segment.

The four subspecies of *schleichi* usually differ in their male genitalia. Only a few specimens are intermediate in genital characters and it therefore seems justified to maintain subspecific status for the different populations.

Biology. Host-plants: *Dianthus scaber toletanus* (Boiss & Reuter) Tutin, *D. deltoides* (Chrétien, 1925: 246); *D. arenarius* L. (Benander, 1926: 172); *D. sylvestris* Wulfen (Klimesch, 1953: 236).

The larva has been found in May in the host-plant stalk which becomes gall-like and stout. It pupates on the ground between leaf-litter (Benander, 1926: 172). Klimesch (1953: 236) states that larvae have been found in young shoots by Burmann. The larval stage also occurs in June (Chrétien, 1925: 246). Moths have been collected from late May to early October.

Distribution. Spain, France, West Germany, Sweden, Austria, Italy, U.S.S.R. (European part), Morocco, Turkey, Syria, Afghanistan [? subsp.].

Additional records. Switzerland (Rebel, 1936: 21); Yugoslavia (Klimesch, 1968: 124); Mongolia (Povolný, 1973: 17) [? subsp.].

Key to the subspecies

1 Head and thorax white, occasionally mottled with light brown ..... ***s. schleichi***
– Head and thorax dark grey-brown, rarely light brown, frons whitish 2
2 Valva with distinct distal hump dorsally ..... ***s. dianthella***
– Valva without distinct distal hump dorsally 3
3 Valva broad, apex with long dorsal process ..... ***s. improvisella***
– Valva comparatively slender, apex with very long dorsal process ..... ***s. arenariella***

Caryocolum schleichi schleichi (Christoph, 1872)

(Figs 54, 130, 196)

Lita schleichi Christoph, 1872: 22, pl. 1, fig. 19. LECTOTYPE ♂, U.S.S.R. (BMNH), here designated [examined].
Lita schleichi Christoph; Rebel, 1901: 149.
Phthorimaea schleichi (Christoph) Meyrick, 1925: 96; Gaede, 1937: 286.
Gnorimoschema schleichi (Christoph) Klimesch, 1953: 235, figs 10, 11.
Caryocolum schleichi (Christoph) Klimesch, 1968: 124, fig. 5; Derra, 1985: 373, figs 2, 7, 8.
Caryocolum syriacum Povolný, 1977*c*: 171, figs 1, 2, 6. Holotype ♂, Syria (coll. Povolný, Brno) [examined]. **Syn. n.**

Adult (Fig. 54). ♂, 4·5–5·5 (6·5) mm, ♀, 4·5–5·0 mm. Head white. Labial palpus white, third segment mottled with dark brown. Thorax and tegula white, a few dark brown scales anteriorly, sometimes mottled with light brown.

Genitalia ♂ (Fig. 130). As described on p. 487. Valva with comparatively short apical processes.

Genitalia ♀ (Fig. 196). As described on p. 487.

Remarks. The nominate subspecies differs externally from *s. dianthella*, *s. improvisella* and *s. arenariella* in the usually white head and thorax.

L. schleichi was described from an unspecified number of specimens collected near Krasnoarmeysk ('Sarepta') by Christoph. One of the 4 male syntypes I have examined is here designated as lectotype.

BIOLOGY. Host-plant unknown. Moths have been caught from late May to early June (Syria) and from mid-June to early September (U.S.S.R.). The species is probably univoltine and moths occur earlier in the year in southern habitats.

DISTRIBUTION. U.S.S.R. (south-west), Turkey, Syria, [?Afghanistan].
Additional record. Yugoslavia (Klimesch, 1968: 124).

MATERIAL EXAMINED (including 7 ♂, 3 ♀ genitalia preparations)
Lectotype ♂ (*schleichi*), **U.S.S.R.**: Krasnoarmeysk, [40 km S. of Volgograd] ('S-Russia, Sarepta'), 22.vii.1868 (*Christoph*) (BMNH). Holotype ♂ (*syriacum*), **Syria**: Damascus, airport area, 28.v.1965 (*Povolný*) (coll. Povolný, Brno).
U.S.S.R.: 3 ♂ (*schleichi* paralectotypes), Krasnoarmeysk [40 km S. of Volgograd], 24.vii.1859, 31.vii.1864, 1865 (*Christoph*); 4 ♂, 2 ♀, same locality, 16.vi.1873, 5.ix.1874 (*Christoph*) (BMNH). **Turkey**: 1 ♂, Prov. Siras, Gürün, 28.vi.1976 (*Pinker*) (coll. Derra, Bamberg). **Syria**: 1 ♂, 1 ♀, Damaskus, 25 km W. of, 2–3.vi.1961, 8.vi.1961 (*Kasy & Vartian*) (coll. Burmann, Innsbruck).
Material possibly representing a distinct subspecies. **Syria**: 2 ♂, Haleb, Shar Deresy (BMNH). **Afghanistan**: 3 ♂, 2 ♀, Paghman, 30 km NW. of Kabul, 2200–2500 m, 20–30.vii.1962, 4–8.viii.1965, 29.vi.–8.vii.1963 (*Kasy & Vartian*) (BMNH; NM).

Caryocolum schleichi dianthella (Chrétien, 1925) stat. n.

(Figs 55, 131, 197)

Lita dianthella Chrétien, 1925: 246. Syntypes, SPAIN: Segovia, La Granja de San Ildefonso (MNHN) [not examined].
Phthorimaea dianthella (Chrétien) Gaede, 1937: 255.
Caryocolum dianthella (Chrétian) Agenjo, 1962: 160, pl. 2, /1g. 8, pl. 3, fig. 7.
Caryocolum hackeri Derra, 1985: 373, figs 1, 4, 5, 6. Holotype ♂, SPAIN (coll. Derra, Bamberg) [examined]. **Syn. n.**

ADULT (Fig. 55). ♂, ♀, 4·0–5·0 mm. Head light brown mottled with grey-brown, particularly at vertex. Labial palpus whitish, second segment brown on outer surface; third segment blackish, flecked white. Thorax and tegula whitish mottled with grey.

GENITALIA ♂ (Fig. 131). As described on p. 487. Valva with two short apical processes, distal part with distinctive dorsal hump.

GENITALIA ♀ (Fig. 197). As described on p. 487. Ventral part of eighth segment with indistinct folds.

REMARKS. *C. s. dianthella* differs from *s. improvisella* and *s. arenariella* by its light thorax and head. It sometimes resembles dark specimens of *s. schleichi* but is distinguished by the hump of the valva.
L. dianthella was described from an unspecified number of specimens collected in Spain. The genitalia of a type-specimen are figured by Agenjo (1962) and I have examined a colour transparency of two syntypes which are now preserved in the MNHN, Paris.
Derra (1985: 373) was unaware of the existence of *s. dianthella* and consequently described this taxon as *C. hackeri*.

BIOLOGY. Host-plants: *Dianthus scaber toletanus* (Boiss & Reuter) Tutin, *D. deltoides* L. (Chrétien, 1925: 246).
Chrétien (loc. cit.) found the larvae in May and June and moths emerged in July. In its habitat moths have been caught from late June to early October.

DISTRIBUTION. Spain, France (Pyrenees), Morocco.

MATERIAL EXAMINED (including 8 ♂, 2 ♀ genitalia preparations)
Holotype ♂ (*hackeri*), **Spain**: Pyrenees, Lerida province, Bellver de Cerdaña, 900 m, 20.ix.1981 (*Derra*) (genitalia slide no. 86/248 P. Huemer; coll. Derra, Bamberg).
Spain: 1 ♂, 1 ♀ (*hackeri* paratypes), same data as holotype but 7.x.1981 (*Derra*) (coll. Derra, Bamberg); 2 ♂, Granada province, Sierra Nevada, Puerto de la Ragua, 1000 m, 25.vi.1968, 20.vii.1969 (*Sattler & Carter*); 2 ♂, 1 ♀, Granada province, Sierra de Alfacar, 1500 m, 3.vii.1962, 13.ix.1972 (*Sattler*); 1 ♂, Huesca province, Jaca, 12.viii.1933 (*Fassnidge*) (all BMNH); 5 ♂, 1 ♀, Granada province, Sierra Nevada, Cam. de Veleta, 2000–2300 m, 24.vii.1983, 19.viii.1984 (*Traugott-Olsen*) (coll. Traugott-Olsen, Marbella; Huemer, Innsbruck). **France**: 2 ♂, 1 ♀, Pyrénées-Orientales, Thuès-les-Bains, larvae 24.vi.1900 on *Dianthus*, moths emerged 26.vii.1900 (*Walsingham*) (BMNH). **Morocco**: 1 ♂, Haut Atlas, Oukaïmedene, 2600 m, 9, 11.vii.1975 (*Kasy*) (NM).

Caryocolum schleichi improvisella (Rebel, 1936) **stat. n.**

(Figs 56, 57, 132, 198)

Lita improvisella Rebel, 1936*b*: 3, pl. 1, fig. 7. Syntypes, SWITZERLAND: [Graubünden,] Remüs (Unterengadin), 21.vii.1931, Landquart, 1.vii.1922 (*Thomann*) [not traced].
[? *Gelechia leucomelanella* Zeller; Zeller, 1868*b*: 613. Misidentification.]
Phthorimaea improvisella (Rebel) Gaede, 1937: 263.
Gnorimoschema improvisellum (Rebel) Klimesch, 1953: 235, figs 12–15.
Caryocolum improvisellum (Rebel) Hartig, 1964: 41; Derra, 1985: 373, figs 3, 9.
[*Caryocolum arenariellum* (Benander); Hartig, 1964: 41. Misidentification.]

ADULT (Figs 56, 57). ♂, 4·5–6·0 (7·0) mm, ♀, 5·0–6·0 mm. Head dark brown, mottled with white; frons white to cream. Labial palpus cream; second segment brownish on outer surface; third segment blackish, flecked with white. Thorax and tegula dark brown, sometimes light apically.

GENITALIA ♂ (Fig. 132). As described on p. 487. Valva broad, short, rounded and long, pointed distal processes.

GENITALIA ♀ (Fig. 198). As described on p. 487.

REMARKS. *C. s. improvisella* differs from the nominate subspecies and *s. dianthella* in its darker head and thorax and the shape of the valva. It is usually larger than *s. arenariella* and the broad valva with a comparatively short dorsal process is another difference.

L. improvisella was described from 1 ♂, 1 ♀ collected in Switzerland by Thomann. Although the type-material has not been traced, there is no doubt about the true identity of *improvisella* as Klimesch (1953) figures the male genitalia of a syntype.

BIOLOGY. Host-plant: *Dianthus sylvestris* Wulfen (Klimesch, 1953: 236).

Burmann (pers. comm.) found the larva feeding within shoots of the host-plant and moths emerged from early July to the beginning of August.

DISTRIBUTION. France, West Germany, Austria, Italy.

Additional record. Switzerland (Rebel, 1936*b*: 21). A record from Mongolia (Povolný, 1973: 17) cited as close to *improvisellum* belongs possibly to another subspecies [? *arenariella*].

MATERIAL EXAMINED (including 5 ♂, 2 ♀ genitalia preparations)

France: 1 ♂, Hautes Alpes, Nevache, 17.viii.1938 (*Fassnidge*) (BMNH). **Germany (West)**: 1 ♀, [Bavaria,] Wörth (*Hofmann*) (BMNH). **Austria**: 1 ♂, Tirol, Vennatal, 1500 m, e.l. 2.viii.1956 (*Dianthus sylvestris*) (*Burmann*) (coll. Burmann, Innsbruck); Tirol, Umhausen, 1500 m, e.l. 9, 10.vii.1948 (*Dianthus sylvestris*) (*Burmann*) (coll. Burmann, Innsbruck). **Italy**: 1 ♂, Trentino-Alto Adige, Villamontagna, 600 m, 17.viii.1982 (*Burmann*) (coll. Burmann, Innsbruck); 5 ♂, 7 ♀, Friuli, Raibl, 14–24.vii.1867 (*Zeller*) (BMNH).

Caryocolum schleichi arenariella (Benander, 1937) **stat. n.**

(Figs 58, 133, 199)

Lita arenariella Benander, 1937: 31, figs A, B. Syntypes, SWEDEN: Schonen: Saltvik; Kivik; Borgeby, moths bred end of vii.1922 (larvae in *Dianthus arenarius* stems) (*Benander*) [not traced].
[*Lita leucomelanella* (Zeller); Benander, 1926: 171, figs 1, 4–9, 13–15. Misidentification.]
Lita arenariella Benander, 1941: 43, fig. 3f.
[*Phthorimaea kiningerella* (Herrich-Schäffer); Palm, 1947: 38, figs 1B, D. Misidentification.]
Gnorimoschema arenariellum (Benander) Klimesch, 1953: 237, figs 16, 17.
Caryocolum arenariellum (Benander); Povolný, 1980: 197.

ADULT (Fig. 58). ♂, 4·0–5·0 mm, ♀, 3·5–4·5 mm. Head dark grey-brown, flecked with light grey; frons greyish white. Labial palpus dark brown, second segment cream on inner surface, third segment blackish mottled with white. Thorax and tegula as head. Fore wing: markings usually indistinct.

GENITALIA ♂ (Fig. 133). As described on p. 487. Valva slender with very long, slender dorsal process distally.

GENITALIA ♀ (Fig. 199). As described on p. 487.

REMARKS. *C. s. arenariella* is the smallest and darkest subspecies. It differs from *s. improvisella* in the more

slender valva and the usually longer distodorsal process. *C. s. schleichi* and *s. dianthella* are distinguished by the light rather than dark colour of the head and thorax as well as by the shape of the valva.

L. arenariella was described from an unspecified number of specimens which have not been traced. As Benander gives a detailed description of the moth, genitalia and biology, there is no doubt about the true identity of this subspecies.

BIOLOGY. Host-plant: *Dianthus arenarius* L.

The larvae feed in May in the stems of the host-plant which become stout and swollen. They pupate outside of the gall, on the ground (Benander, 1926: 173). Moths have been collected from late June to early September.

DISTRIBUTION. Sweden (south), U.S.S.R. (Latviya).

A record from Austria (Hartig, 1964: 41) probably refers to *s. improvisella.*

MATERIAL EXAMINED (including 3 ♂, 2 ♀ genitalia preparations)

Sweden: 3 ♂, 2 ♀, Sk., Tyngsjö, 4.ix.1957, 24.vii.1965 (*Svensson*) (coll. Svensson, Österslöv; BMNH); 1 ♂, Sk., Vitemölla, 22–31.vii.1965 (*Svensson*) (ZM); 1 ♂, [Schonen,] Kivik, 20.vi.1964 (*Benander*) (ZM). **U.S.S.R.**: 1 ♂, Latviya S.S.R., Mangalsala, 9.viii.1977 (*Sulcs*) (ZM).

The *marmoreum*-group

GENITALIA ♂. Tegumen strongly tapered posteriorly; anterior margin with deep or shallow emargination. Transtilla band-like, narrow. Valva short, slender, linear. Sacculus broad, almost rhomboid, distal part rounded ventrally, dorsal margin slightly concave; sacculus extending slightly beyond valva. Vinculum very short; posterior margin with pair of subtriangular medial and pair of short digitate lateral processes; deeply incised medially, lateromedially emarginate. Saccus long, slender. Anellus with pair of small pegs. Aedeagus slightly bent, base distinctly swollen, with many minute apical cornuti.

GENITALIA ♀. Eighth segment with strongly sclerotized anterior margin; with pair of large vaulted semiovate sclerotizations; ventromedial part with triangular sclerite converging towards posterior margin of segment. Antrum ring-shaped, very short. Posterior part of ductus bursae with pair of narrow, short lateral sclerotizations; anteriorly two further tiny sclerites. Signum a strongly curved hook.

BIOLOGY. Host-plants: Alsinoideae (*Cerastium*); Silenoideae (*Silene*).

Caryocolum marmoreum (Haworth, 1828)

(Figs 59–63, 134, 135, 200)

Recurvaria marmorea Haworth, 1828: 553.

ADULT (Figs 59–63). ♂, ♀, 4·5–5·5 mm. Head mottled light to dark brown, grey or blackish, exceptionally white; face paler. Second segment of labial palpus speckled with light to dark brown on outer and ventral surface, inner surface whitish; third segment blackish mottled with white. Thorax and tegula as head. Fore wing mottled brown to blackish; dorsal margin light, pale greyish to mid brown, two triangular cream to brown patches across fold at one-fifth and middle; black markings: basal stripe from fold to costa, patches at two- and three-fifths, latter extended towards tornus. White costal and tornal spots separate or confluent, forming a fascia.

GENITALIA ♂ (Figs 4, 134, 135). Eighth tergite deeply emarginate anteriorly. Eighth sternite considerably elongated anteriorly. Tegumen with deeply emarginate anterior margin.

GENITALIA ♀ (Fig. 200). As described under *marmoreum*-group.

REMARKS. *C. marmoreum* shows remarkable external variation, with variegated to almost uniformly coloured fore wings. Specimens from southern Europe are usually darker and sometimes without a distinctive pattern. A population from the Canary Islands (Fig. 62) is larger and could prove to be a distinct subspecies. However, it seems unjustifiable to describe new subspecies when even series of moths caught in one locality exhibit remarkable variation in fore wing pattern as well as in the colour of the head, thorax and tegula.

C. marmoreum is usually separable from *pullatella* by its variegated fore wing pattern and the brown rather than blackish ground colour. It differs from the externally very similar *provinciella* in the pale frons, and from *C. sciurella* in many genital characters such as the shape of the sacculus and the signum. The male genitalia of *marmoreum* resemble those of *pullatella* and *protectum* but differ from both in the shape of the tegumen and the eighth segment which is much more elongated as well as emarginated (Fig. 4). The female

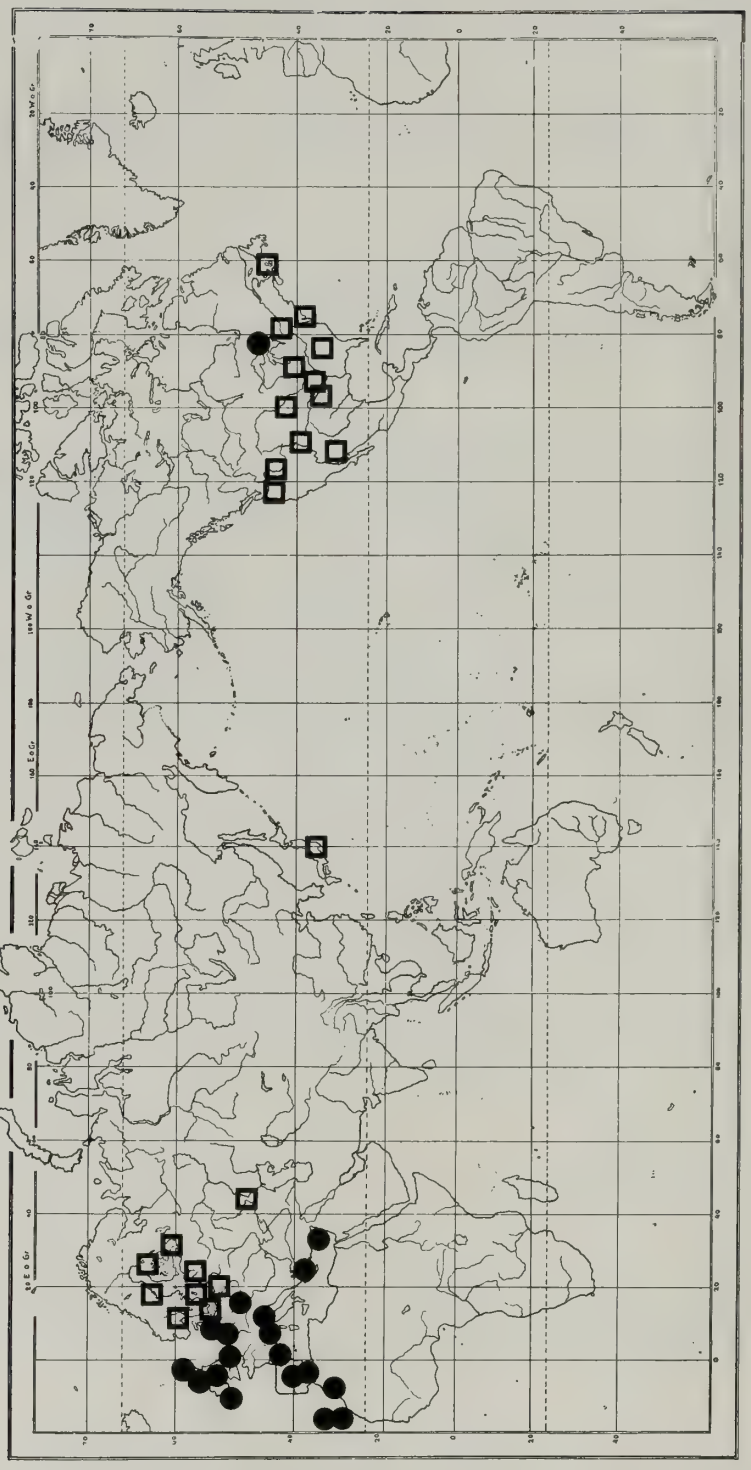
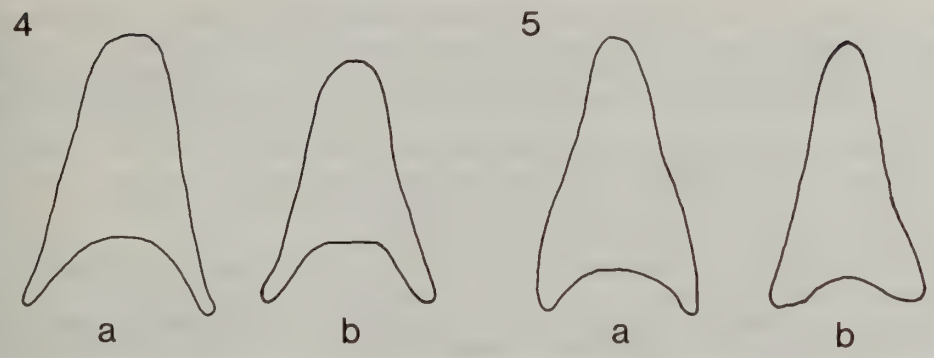


Fig. 3 Distribution map of *Caryocolum marmoreum* (Haworth) and *pullatella* (Tengström) (based on examined specimens).



Figs 4, 5 Eighth tergite, ♂. 4, *Caryocolum marmoreum* (Haworth), (a) Madeira Islands, (b) Greece. 5, *C. pullatella* (Tengström), (a) Canada, (b) U.S.S.R.

genitalia are of considerable variation particularly in the length of the apophyses anteriores. I could not find any differences from related species of the *marmoreum*-group. The range of *marmoreum* and *pullatella* seems not to overlap (Fig. 3) and, despite minute differences in the external appearance and the genitalia, at present it is most appropriate to treat them as good species.

Caryocolum marmoreum marmoreum (Haworth, 1828)

(Figs 59–62, 134, 135, 200)

Recurvaria marmorea Haworth, 1828: 553. LECTOTYPE ♂, [GREAT BRITAIN: England] (BMNH), here designated [examined].
Anacampsis marmorea (Haworth); Stephens, 1835: 213.
[*Anacampsis guttifera*; Wood, 1837: 142, pl. 11, fig. 3. Misidentification.]
Gelechia manniella Zeller, 1839: 198. Lectotype ♂, POLAND (Silesia) (BMNH), designated by Karsholt (1981: 264) [examined]. [Synonymized by Karsholt, 1981: 264.]
Gelechia marmorea (Haworth) Douglas, 1850: 104.
Gelechia marmorella Doubleday, 1859: 30. [Unjustified emendation of *Recurvaria marmorea* Haworth.]
Lita marmorea (Haworth) Heinemann, 1870: 264; Benander, 1928: 79.
Phthorimaea marmorea (Haworth) Meyrick, 1925: 96.
Gnorimoschema marmoreum (Haworth); Klimesch, 1954: 280, figs 15, 16.
Caryocolum marmoreum (Haworth) Hartig, 1964: 42.
Caryocolum sp.; Klimesch, 1984: 158, figs 52–54.

ADULT (Figs 59–62). ♂, 5·0–5·5 mm, ♀, 4·5–5·5 mm. Head, thorax and tegula mottled light to dark brown, grey or blackish.

GENITALIA ♂ (Fig. 134, 135). As described under *marmoreum*.

GENITALIA ♀ (Fig. 200). As described under *marmoreum*-group.

REMARKS. The nominate subspecies differs from *m. pulchrum* in the colour of the head, thorax and tegula.

R. marmorea was described from an unspecified number of specimens. I designate as lectotype the male specimen which is already labelled 'lectotype' by Sattler.

G. manniella was described from an unspecified number of specimens by Zeller who erroneously attributed it to Fischer von Röslerstamm. It has been synonymized with different *Caryocolum* species several times. These errors have been corrected and discussed in detail by Karsholt (1981: 265).

BIOLOGY. Host-plants: *Cerastium fontanum triviale* (Link) Jalas (Stainton, 1867: 142); *C. semidecandrum* L. (coll. Walsingham); *Silene nocteolens* (Klimesch, 1984: 158).

The larva has been found from March to May feeding on leaves from a silken tube covered with grains of sand at the base of the food-plant (e.g. Stainton, 1867: 142). Klimesch (1984: 159) found it between spun leaves of *Silene* on the Canary Islands. Moths have been collected from May to September and are stated to be univoltine. Sorhagen (1886: 195) records hibernating adults, but this observation refers most probably to *junctella*.

The habitats of *marmoreum* are frequently sand-dunes but it also occurs in mountainous areas of Central Europe, North Africa and the Canary Islands.

DISTRIBUTION. Spain, Ireland, Great Britain, Denmark, Netherlands, West Germany, Poland, France, Corsica, Italy, Greece, Crete, Cyprus, Turkey, Morocco, Canada (British Columbia).

Additional records from the literature: Portugal (Vives Moreno, 1985: 13); Switzerland (Müller-Rutz, 1914: 492); Austria, Albania (Klimesch, 1954: 280); Sardinia (Mariani, 1943: 169); Yugoslavia (Klimesch, 1968: 125).

Records from the north-west U.S.S.R. (Klimesch, 1954: 280), Sweden (Benander, 1941: 43) and Norway are possibly misidentification of *pullatella* and need confirmation. From Japan, Povolný (1977: 225) records specimens close to *marmoreum*, but probably these also belong to *pullatella*.

MATERIAL EXAMINED (including 17 ♂, 8 ♀ genitalia preparations)

Lectotype ♂ (*marmorea*), [**Great Britain**: England] (Stephens coll.) (BMNH). Lectotype ♂ (*manniella*), [**Poland**: Silesia] (*Zeller*) (genitalia slide no. 21316; BMNH).

Spain: 1 ♂, Prov. Granada, Sierra Nevada, Cam. de Veleta, 2300 m, 19.viii.1984 (*Traugott-Olsen*) (coll. Traugott-Olsen, Marbella); 3 ♂, 1 ♀, Prov. Madrid, El Escorial, 14.ix.1972 (*Sattler*); 1 ♂, Madrid, 20.iv.1903 e.l. (Vazquez) (BMNH). **Great Britain**: 17 ♂, 20 ♀, England, Norfolk, Merton. 19.vii.1886, 30.vii.1888, 21.vii.1890, 14–31.vii.1893, 30.vii.1897 e.l. larva on *Cerastium semidecandrum*, 4.viii.1898, 27.vii.1899, 27.vii.–12.viii.1900; 1 ex. (*marmorea* paralectotype) (*Stephens*); 1 ♂, Dorset, Chesil Bank-Fleet, 11–20.vi.1958 (*Bradley*); 1 ♂, Stockton; 1 ♂, Cheshire; 1 ♂, Exeter; 2 ♂, 3 ♀, Scotland, Sutherland, Invernaver, 9–12.viii.1964 (*Bradley*); 1 ♂, Inner Hebrides, Sanday I., vii.1956 (*Bradley*) (BMNH). **Ireland**: 6 ♂, 2 ♀, Kerry Co., Inch, 25–31.vii.1963 (*Bradley*) (BMNH). **Denmark**: 5 ♂, 3 ♀, WJ, Skallingen [pen.], 21–24.vii.1978, 30.vi.1982 (*Karsholt*) (ZM). **Netherlands**: 3 ♂, 1 ♀, Zandvoort, 18.vi.1936, 2–3.vii.1937 (*Bentinck*) (BMNH). **Germany (West)**: 3 ♂, 1 ♀, [Schleswig-Holstein] Sylt, List, Süderhorn, 31.vii.–8.viii.1958 (*Tiedemann*); 1 ♂, 1 ♀, Hagenau, M. vi.1885 (*Hofmann*) (BMNH). **Poland**: 1 ♀, Wroclaw ('Breslau') (*Wocke*) (BMNH). **France**: 2 ♀, Hautes Alpes, La Bessèe, 1100 m, 12.ix.1960 (*Burmann*) (coll. Burmann, Innsbruck); 1 ♂, Prelles, 1200 m, E. viii.1973 (*Zürnbauer*) (TLMF); 1 ♂, Alpes-Maritimas, Menton, 24.v.1867 e.l. (larva on *Gypsophila*) [most probably error!] (*Stainton*); 1 ♂, Pyrénées-Orientales, Mont Louis, 13.vii.1900 (*Walsingham*) (BMNH). **Corsica**: 3 ♂, 2 ♀, Corte, 19–28.v.1896 (*Walsingham*) (BMNH). **Italy**: 2 ♂, 1 ♀, Südtirol ('Teriolis merid.'), Laatsch, 1000 m, 15.ix.1980, 22.ix.1981 (*Burmann*); 1 ♂, Taufers, 1200 m, 1.x.1980 (*Burmann*) (coll. Burmann, Innsbruck); 1 ♂, 1 ♀, Südtirol, Vinschgau, Naturns, 1–5.x.1983 (*Skule & Skou*) (ZM). **Greece**: 1 ♂, 1 ♀, Lakonia, Mt Taygetos south of Sparta, Paleopanagia, 1600 m, 10.viii.1985 (*Arenberger*) (coll. Arenberger, Vienna); 1 ♂, 1 ♀, Attiki, Erythrae, 650 m, 29–30.ix.1984 (*Fibiger*) (ZM). **Crete**: Stomion, 50 m, 3–4.v.1971 (*Malicky*) (TM). **Cyprus**: 1 ♂, Troödos Mts ('Gebirge'), north of Troödos, 1500 m, 19–28.vii.1981 (*Arenberger*) (BMNH). **Turkey**: 35 km NNE. of Konya, 11.v.1970 (NM). **Canary Islands**: 1 ♂, 1 ♀, Teneriffa, Cañadas del Teide, 2100 m, e.l. 29.vi., 5.vii.1972 (larvae on *Silene nocteolens*) (*Klimesch*) (coll. Limesch, Linz). **Morocco**: 1 ♂, Hautes Atlas, Oukaïmedene, 1200 m, 26.ix.–1.x.1973 (*Friedel*) (coll. Burmann, Innsbruck). **Canada**: 3 ♂, 1 ♀, B[ritish] C[olumbia], Wellington (*Bryant*) (NMNH). No locality data: 69 ♂, 36 ♀.

Caryocolum marmoreum pulchrum (Wollaston, 1858) **comb. n., stat. n.**

(Fig. 63)

Gelechia pulchra Wollaston, 1858: 121. LECTOTYPE ♂, PORTUGAL (Madeira Islands) [abdomen missing] (BMNH), here designated [examined].
Lita pulchra (Wollaston) Rebel, 1901: 149.
Phthorimaea pulchra (Wollaston) Meyrick, 1925: 96.

ADULT (Fig. 63). ♂, 4·5–5·0 mm. Head, thorax and tegula white. Labial palpus white, a few brown scales on outer surface of second segment.

GENITALIA ♂. As described under *marmoreum*.

GENITALIA ♀. Unknown.

REMARKS. *C. m. pulchrum* differs from the nominate subspecies in the white colour of the head, thorax and tegula.

G. pulchra was described from an unspecified number of specimens and I designate as lectotype the male specimen which is already labelled 'lectotype' by Sattler.

BIOLOGY. Host-plant unknown. Moths have been collected on the Desertas in the Madeira Islands in June.

DISTRIBUTION. Portugal (Madeira Islands).

MATERIAL EXAMINED (including 2 ♂ genitalia preparations)

Lectotype ♂, **Portugal**: Madeira Islands, Deserta Grande, vi.1855 (*Wollaston*) [abdomen missing] (BMNH).

Portugal: 1 ♂ (paralectotype), Madeira Islands, Deserta Grande, vi.1855 (*Wollaston*); 4 ♂, Deserta Grande, 17–18.vi.1962 (*Classey*) (BMNH).

Caryocolum pullatella (Tengström, 1848)

(Figs 64–66, 136, 201)

Gelechia pullatella Tengström, 1848: 126. LECTOTYPE ♂, FINLAND (Zool. Mus. Helsinki) (selected by Karsholt), here designated [not examined].

Gelechia pulla Tengström, 1848: 162. [Unnecessary objective replacement name for *Gelechia pullatella* Tengström, which is not a junior homonym of *Tinea pullatella* Hübner (*Anarsia*).]

Gelechia subtractella Walker, 1864: 592. Holotype ♂, CANADA (Nova Scotia) (BMNH) [examined]. **Syn. n.**

Lita alsinella var. *livoniella* Teich, 1889*b*: 88. Syntypes, U.S.S.R.: Latviya S.S.R. [not traced].

Lita pullatella (Tengström) Rebel, 1901: 149.

Gelechia agricolaris Meyrick, 1933: 448. Holotype ♂, JAPAN (BMNH) [examined]. **Syn. n.**

Phthorimaea pullatella (Tengström) Meyrick, 1925: 96; Hackman, 1946: 6, figs 7, 8.

Gnorimoschema pullatellum (Tengström) Klimesch, 1954: 280, figs 13, 14.

Caryocolum pr. *pullatellum* (Tengström) Povolný, 1977*a*: 225, figs 11, 20.

Caryocolum substractellum (Walker) Povolný, 1980: 197. [Incorrect subsequent spelling of *subtractella* Walker.]

Caryocolum pullatella (Tengström); Jalava, 1977: 15.

Caryocolum subtractella (Walker); Hodges, 1983: 22.

ADULT (Figs 64–66). ♂, ♀, 5·0–6·5 mm. Head mid-brown to blackish, face whitish, bright. Labial palpus whitish on inner surface of second segment; outer surface and third segment mottled dark brown to black. Thorax and tegula as head. Fore wing mottled dark brown; two median white patches in cell at one-fifth and middle. Costal and tornal spots separate or confluent, forming a fascia. Orange brown dorsal and subcostal stripes sometimes present.

GENITALIA ♂ (Figs 5, 136). Eighth tergite slightly emarginate anteriorly. Eighth sternite comparatively short. Tegumen with shallow, rounded emargination anteriorly.

GENITALIA ♀ (Fig. 201). As described under *marmoreum*-group.

REMARKS. *C. pullatella* exhibits extraordinary variation in fore wing pattern and colour. The ground colour is usually more blackish than in *marmoreum* and the pattern shows a tendency to uniformity. Strongly variegated specimens of *pullatella* are also similar to *sciurella* and *provinciella*. From the latter they may be distinguished by the paler frons. In some cases *pullatella* resembles *cassella* in fore wing pattern. Specimens from the high mountains of North America are usually black with white markings. This form also occurs in northern Europe. The male genitalia differ from those of *marmoreum* in the slightly emarginated eighth tergite and tegumen and in the shape of the eight sternite. No constant differences were found in the female genitalia. *C. pullatella* is easily distinguished from *provinciella*, *sciurella* and *cassella* by male and female genital structures.

G. pullatella was described from two specimens collected by Nylander on 13.vii.1843 near Oulu (Finland). The lectotype which was selected by Karsholt is here designated and bears the following labels (Karsholt, in litt.): 1) Fennia, Obs, Uleaborg; 2) coll. Nylander; 3) 251; 4) pulla T_m; 5) Mus. Zool. H;fors, Spec. typ.no. 7055, *pullatella* Tgstr.; 6) (genitalia on celluloid); 7) Lectotype, O. Karsholt design.

G. subtractella was described from a single male from Canada (Nova Scotia) which was erroneously recorded as a female in the original description.

G. agricolaris was described from a single male from Japan which was erroneously recorded as a female by Meyrick. According to the description the holotype was collected in August, although it is labelled '20.vii.1932'. These errors have been discussed by Clarke (1969: 107).

L. alsinella var. *livoniella* was described from an unspecified number of specimens collected near 'Dubbeln' (Latviya S.S.R.). According to Karsholt (1981: 251) it is a junior synonym of *pullatella*.

BIOLOGY. Host-plant unknown. Moths have been found from the middle of May to the middle of October. However, *pullatella* is probably univoltine.

DISTRIBUTION. Denmark, Norway, Sweden, Finland, U.S.S.R. (NW. part), Japan, U.S.A., Canada.

The distribution of *pullatella* seems not to overlap with that of *marmoreum* (Fig. 3).

MATERIAL EXAMINED (including 15 ♂, 11 ♀ genitalia preparations)

Holotype ♂ (*subtractella*), **Canada**: Nova Scotia (genitalia slide no. 9207; BMNH). Holotype ♂ (*agricolaris*), **Japan**: Tokyo, 20.vii.1932 (*Issiki*) (genitalia slide no. 8273 J.F.G.C.; BMNH).

Denmark: 1 ♂, SZ, Skibinge, 15–18.viii.1982 (*Karsholt*) (ZM). **Norway**: 1 ♀, Vestad, Elverum HES, 12.viii.1980 (*Aarvik*) (ZM); 3 ♂, Os, Ringebu, 6, 7.viii.1981 (*Aarvik*); 1 ♂, Ås, Ak, 25.viii.1981 (*Aarvik*) (BMNH). **Finland**: 2 ex., Kn. Puolanka, 7.viii.1966, 1.viii.1967 (*Kiianlinna*) (ZM); 2 ♂, PP Oulu, 8, 11.viii.1971 (*Kyrki*) (BMNH). **Sweden**: 1 ♂, 1 ♀, Ån, Hemsön, 3, 4.viii.1982 (*Svensson*); 1 ♀, To, Masugnsbyn, 3.viii.1985 (*Svensson*) (coll. Svensson, Österslöv); 1 ex., Sm., N. Åreda, 15 km NE. Växjö, 20.vi.1975 (*Johansson*) (ZM); 1 ♂, Vb. Umeå, Rödåliden, 11.viii.1952 (BMNH). **U.S.S.R.**: 2 ♀, Latviya S.S.R. ('Livl.'), Wolmar (*Larsen*) (ZM); 1 ♂, 3 ♀, Kaliningrad ('Königsberg') (*Sauter*); 1 ♂, Leningrad ('Petrop.'), 17.vii.1885 (*Christoph*); 1 ♂, [S. of Volgograd,] Krasnoarmeysk ('Sarepta'), 19.viii.1861 (*Christoph*) (BMNH). **Japan**: 1 ♂, 1866 (BMNH). **U.S.A.**: 5 ♂, 7 ♀, Oregon, Clatsop Co., Seaside, 4.vii.1955 (*Clarke*); 1 ♂, 2 ♀, Oregon, Baker Co., Big Lookout Mtn., 13.vii.1974 (*Baker*); 2 ♂, 1 ♀, Arizona, Coconino Co., Hart Prairie, 8500′, 10 mi NW. Flagstaff, 23.vi., 14.vii., 28.viii.1961 (*Hodges*); 4 ♂, 1 ♀, Arizona, Coconino Co., Hochderffer Hill, 8500′, 10·5 mi NNW. Flagstaff, 16.vii.–6.viii.1961 (*Hodges*); 1 ♂, Arizona, Coconino Co., West Fork, 6500′, 16 mi SW. Flagstaff, 5.viii.1961 (*Hodges*); 125 ♂, 113 ♀, Arkansas, Wash. Co., Devil's Den. St. Pk., 19.v.–22.vii.1966 (*Hodges*); 2 ♂, 5 ♀, Arkansas, Washington Co., 29.vii.–2.viii.1966 (*Brown*); 2 ♂, 4 ♀, Arkansas, Mt. Magazine (Lodge area), 6, 9.vi.1964 (*Clarke*); 3 ♂, 1 ♀, Utah, Sanpete Co., Head Ephrain Canyon, 10,000–10,300′, 28.vii.1981 (*Hodges*); 1 ♂, Texas, Dallas, 19.x.1907; 1 ♂, Nebraska, Cherry Co., Ft. Niobrara NWR, 29.vi.1983 (*Hodges*); 1 ♀, Kansas, Labette Co., Oswego, 19.v.1970 (*Heuel*); 4 ♂, 3 ♀, Oklahoma, Sequo, Co., Lake Trankiller, 2 mi NW. Blackgum, 11–14.vi.1981 (*Davis*); 1 ♂, Missouri, 5 mi S. Joplin, 25.vi.1968 (*Todd*); 10 ♂, 2 ♀, Illinois, Putnam Co., 30.v.–11.vi.1962, 14.v.–15.vi.1963, 1–9.vi.1965, 4.vi.1966, 1.vii.1969, 27.v.1970, 22.viii.1972, 9–12.vi.1973 (*Glenn*); 2 ♂, New Jersey, Lakehurst, 30–31.v.1962 (*Hodges*); 1 ♀, New Jersey, Tom's River, 30.v.1907; 1 ♀, New York, Tompkins Co., McLean Bogs Reserve, 23.ix.1960 (*Hodges*); 1 ♂, North Carolina, Macon Co., Highlands, 3865′, 5.vii.1958 (*Hodges*) (all NMNH). **Canada**: 3 ♂, 2 ♀, Nova Scotia, Victoria Co., Baddeck River, near Baddeck Bridge, 17.viii.1967 (*Ferguson*) (NMNH).

Caryocolum protectum (Braun, 1965)

(Figs 67, 137, 202)

Gnorimoschema protecta Braun, 1965: 187. Holotype ♂, U.S.A. (Kentucky) (Braun) [not traced].
Caryocolum protectum (Braun) Povolný, 1980: 197.
Caryocolum protecta (Braun); Hodges, 1983: 22.

ADULT (Fig. 67). ♂, ♀, 6·0 mm. Head clay-coloured, frons pale. Labial palpus blackish, inner surface of second segment whitish. Thorax clay-coloured, scales tipped with orange-brown. Fore wing as thorax; indistinct light transverse fascia at four-fifths; black medial spot at three-fifths extended towards tornus; small dark spots in fold; fore wing apex mottled with black scales.

GENITALIA ♂ (Fig. 137). Eighth tergite slightly emarginate anteriorly. Eighth sternite comparatively short. Tegumen with shallow, rounded emargination anteriorly.

GENITALIA ♀ (Fig. 202). As described under *marmoreum*-group.

REMARKS. *C. protectum* can hardly be confused with other species of the genus because of its characteristic fore wing colour. It is here treated as a good species although it resembles *pullatella* in genitalia. It is possible that *protectum* may prove to be conspecific with *pullatella*.

G. protecta was described from 10 ♂, 12 ♀ from the U.S.A. (Kentucky). I have examined two paratypes.

BIOLOGY Host-plant: *Silene rotundifolia* Nuttal (Braun, 1965: 187).

The larva feeds from mid-October throughout the winter, first on the winter rosettes and later on young shoots. In spring it spins two opposite leaves together, bores into the tip of the stem and feeds on the terminal leaves. The larva pupates from May to June and moths emerge from early May to the middle of July (Braun, 1965: 188).

DISTRIBUTION. U.S.A. (Kentucky).

MATERIAL EXAMINED (including 1 ♂, 1 ♀ genitalia preparations)

U.S.A.: 1 ♂, 1 ♀ (paratypes), Kentucky ('Ky'), McCreary Co., Yahoo Cr., moths emerged 2, 6.v.1951 (*Braun*) (NMNH).

The *stramentella*-group

GENITALIA ♂. Uncus with pair of transverse folds dorsally; narrower than tegumen. Transtilla with numerous minute spines. Valva broad at base; distal part digitate, slightly curved at apex. Sacculus shorter and broader than valva. Posterior margin of vinculum extremely emarginated lateromedially; medial pair of long, almost completely fused, needle-shaped processes. Saccus broad at base, distal part tapered. Aedeagus stout, distinctly bent, with few minute apical cornuti.

GENITALIA ♀. Unknown.

BIOLOGY. Host-plant unknown.

Caryocolum stramentella (Rebel, 1935) comb. n.

(Figs 68, 138)

Bryoptropha stramentella Rebel, 1935: 39. LECTOTYPE ♂, TURKEY (NM), here designated [examined]. *Gelechia stramentella* (Rebel) Gaede, 1937: 216.

ADULT (Fig. 68). ♂, 5·5 mm. Head cream, vertex speckled with brown. Labial palpus cream, mottled with light brown. Thorax and tegula greyish brown; distal part of tegula whitish. Fore wing mottled brown, particularly distad; irregular transverse cream fasciae at one-fifth and one-half; dorsal margin darker; small black spots basally in fold and on costa; indistinct broken black fascia from fold to costa at one-quarter; dark mottling distad of cell extended towards tornus. Cream costal and tornal spots confluent, forming a narrow fascia.

GENITALIA ♂ (Fig. 138). Valva slender, slightly curved at apex. Sacculus broad, distally strongly tapered.

GENITALIA ♀. Unknown.

REMARKS. *C. stramentella* is very similar to *emarginatum* externally and in genital characters. It differs mainly in the significantly more slender valva and sacculus.

B. stramentella was described from two male specimens collected in Turkey. One of the syntypes, now preserved in the collections of the ZSBS, is conspecific with *Caryocolum inflativorella*. The other specimen, unfortunately very worn, is here designated as lectotype.

BIOLOGY. Host-plant unknown. The only specimen known was collected in the second half of September.

DISTRIBUTION. Turkey.

MATERIAL EXAMINED (including 1 ♂ genitalia preparation).

Lectotype ♂, **Turkey**: ('Asia minor') Anatolia c., Akşehir, 1200 m, 16–30.ix.1934 (genitalia slide no. 13076; NM).

Caryocolum emarginatum sp. n.

(Figs 69, 139)

ADULT (Fig. 69). ♂, 6·5 mm. Head cream, vertex speckled with brown. Labial palpus cream, third segment mottled light brown. Thorax and tegula greyish brown; distal part of tegula cream. Fore wing mottled brown with irregular transverse cream fasciae at one-fifth and one-half; dorsal margin greyish brown; incomplete dark brown basal fascia: spots on costa, in fold and on dorsal margin; indistinct broken fascia from fold to costa at one-quarter, extended medially; black stripe distad of cell extended towards tornus. Cream costal and tornal spots confluent, forming a broad fascia.

GENITALIA ♂ (Fig. 139). Valva broad, curved at apex. Sacculus very broad, distally evenly tapered.

GENITALIA ♀. Unknown.

REMARKS. *C. emarginatum* is very similar in fore wing pattern to *stramentella* but differs in the shape of the valva and sacculus.

BIOLOGY. Host-plant unknown. The single example known was collected in August.

DISTRIBUTION. Italy (Piemonte).

Material examined (including 1 ♂ genitalia preparation).

Holotype ♂, **Italy**: Piemont[e], Courmayeur, 5.viii.1917 (*Walsingham*) (genitalia slide no. 24414; BMNH).

The *fraternella*-group

Genitalia ♂. Uncus narrow, short. Tegumen broad, anterior part emarginated, strongly tapered posteriorly; large pedunculi. Transtilla with a few to numerous spines. Valva extremely broad, with two apical humps. Sacculus fused with valva, separated in *hispanicum*. Posterior margin of vinculum with deep jug-shaped medial emargination, one to two pairs of short lateromedial processes. Saccus broad at base, tapered.

Genitalia ♀. Eighth segment without processes or folds. Antrum long, tubular, occasionally short and ring-shaped. Ductus bursae sometimes with pair of tiny sclerites posteriorly. Signum a large hook.

Biology. Host-plants: Alsinoideae (*Stellaria*, *Cerastium*).

Caryocolum hispanicum sp. n.

(Figs 70, 140, 203)

Adult (Fig. 70). ♂, 5·5 mm, ♀, 5·0 mm. Head grey, frons cream. Labial palpus cream mottled with light brown; third segment blackish. Thorax and tegula grey-brown, distally fuscous. Fore wing mottled brown, darker at apex; indistinct orange-brown dorsal and subcostal patches; small, sometimes indistinct black spots along fold; black markings: patch from fold to costa at one-quarter, small subcostal spot at two-fifths and spot distad of cell extending towards tornus. Costal and tornal spots white, usually separate.

Genitalia ♂ (Fig. 140). Uncus narrow. Transtilla well developed with numerous spines. Dorsal hump of valva slightly pointed, longer than rounded ventral hump. Posterior margin of vinculum with pair of digitate processes. Saccus broad at base.

Genitalia ♀ (Fig. 203). Apophysis anterior about 1·5 times length of eighth segment. Antrum long, tubular. Ductus bursae with pair of short posterior sclerites. Signum a large slender hook.

Remarks. *C. hispanicum* closely resembles *fraternella* in the fore wing pattern but differs in the paler colour.

A single specimen from Greece, unfortunately in poor condition, is slightly different in the shape of the valva and is therefore excluded from the type-series.

Biology. Host-plant unknown. Moths have been caught in July.

Distribution. Spain, [Greece ?].

Material examined (including 1 ♂, 1 ♀ genitalia preparations)

Holotype ♂, **Spain**: Prov. Avila, [Sierra de] Gredos, Navarredonda [de la Sierra], 29.vii.1970 (*Sattler & Kirby*) (genitalia slide no. 24613; BMNH).

Paratype. **Spain**: 1 ♀, Prov. Avila, Sierra de Gredos, Garganta de las Pozas, 1800 m, 17.vii.1970 (*Sattler & Kirby*) (BMNH).

Excluded from paratype series. **Greece**: 1 ♂, Achaia, Mt Chelmos, 1600 m, 20.vi.1978 (*Christensen*) (ZM).

Caryocolum confluens sp. n.

(Figs 71, 141, 204)

Adult (Fig. 71). ♂, ♀, 6·0 mm. Head white. Labial palpus whitish; outer surface of second and third segment mottled with dark brown. Thorax and tegula dark brown mottled with grey, distal parts whitish. Fore wing blackish; white transverse fascia near base; further white band from fold to costa at two-fifths. Costal and tornal spots at four-fifths, separate.

Genitalia ♂ (Fig. 141). Uncus comparatively broad. Transtilla weakly sclerotized, with a few spines. Apical humps of valva rounded. Sacculus partly fused with valva. Posterior margin of vinculum with pair of digitate processes. Saccus slender.

Genitalia ♀ (Fig. 204). Apophysis anterior about 1·5 times length of eighth segment. Antrum short, ring-shaped. Posterior part of ductus bursae with pair of short lateral sclerites. Signum a large, strongly curved hook.

REMARKS. *C. confluens* is easily recognized by the black and white pattern of the fore wing. It differs from similar species of the *trauniella*-group in the darker thorax and smaller size.

The male genitalia are of special interest within *Caryocolum* because of their partly fused sacculus.

BIOLOGY. Host-plant unknown. Moths have been found from late June to early July.

DISTRIBUTION. Greece.

MATERIAL EXAMINED (including 1 ♂, 1 ♀ genitalia preparations)

Holotype ♂, **Greece**: Lakonia, Mt Taygetos, above Trapezandi, 1500 m, 5.vii.1984 (*Skule*) (genitalia slide no 86/380 P. Huemer; ZM).

Paratype. **Greece**: 1 ♀, Achaia, Mt Chelmos, 1600 m, 28.vi.1983 (*Skule*) (ZM).

Caryocolum fraternella (Douglas, 1851)

(Figs 72, 142, 205)

Gelechia fraternella Douglas, 1851: 101. LECTOTYPE ♂, GREAT BRITAIN: England (BMNH), here designated [examined].

Lita intermediella Hodgkinson, 1897: 36. Holotype ♂, GREAT BRITAIN: England (BMNH) [examined]. [Synonymized by Tutt, 1897: 36.]

Lita fraternella (Douglas) Rebel, 1901: 148; Benander, 1928: 78, pl. 6, fig. 37; Benander, 1941: 43, fig. 3e.

Phthorimaea fraternella (Douglas) Meyrick, 1925: 96.

Gnorimoschema fraternellum (Douglas) Klimesch, 1954: 281, fig. 17.

Caryocolum fraternella (Douglas); Bradford, [1979]: 128.

ADULT (Fig. 72). ♂, ♀, 5·0–6·0 mm. Head light to dark brown. Labial palpus cream mottled with brown, particularly on outer surface; third segment blackish. Thorax and tegula as head, tegula lighter apically. Fore wing mottled brown; orange-brown scales along costa, in fold and distad of cell. Indistinct black spots: two along fold, one distad of cell extending to dorsal margin, usually comma-shaped. Costal and tornal spots separated by orange-brown streak, sometimes confluent, forming a fascia.

GENITALIA ♂ (Fig. 142). Uncus narrow, short. Apical humps of valva slightly pointed. Sacculus tiny, almost completely fused with valva. Transtilla with many spines. Posterior margin of vinculum with two pairs of indistinct processes. Saccus slender.

GENITALIA ♀ (Fig. 205). Apophysis anterior shorter than eighth segment. Antrum long, tubular. Signum a large, stout, slightly bent hook.

REMARKS. *C. fraternella* sometimes resembles *alsinella* in wing pattern, although it usually differs in the separated costal and tornal spots as well as in the extent of the orange-brown scales. It differs from the externally very similar *hispanicum* in the deep orange-brown colour of these scales. In the male genitalia *fraternella* is easily recognized by the almost completely reduced sacculus.

G. fraternella was described from an unspecified number of specimens caught at Lewisham by Stainton. I have examined two of the type-specimens, one of which is here designated as lectotype.

L. intermediella was described by Hodgkinson from a single specimen and synonymized by Tutt in a note to the description on the same page.

BIOLOGY. Host-plants: *Stellaria holostea* L., *S. alsine* Grimm (Schütze, 1931: 92); *S. graminea* L. (Bradford, [1979]: 128); *Cerastium fontanum* Baumg. [incl. ssp. *triviale* (Link) Jalas] (Klimesch, 1954: 281); *Cerastium arvense* L. (coll. Hofmann). A specimen from *Cerastium semidecandrum* L. (coll. Walsingham) is possibly mislabelled.

The larva feeds between spun young shoots from late April to late May (Stainton, 1867: 122). Moths have been bred from June to July but most adults caught in the wild were collected in August.

DISTRIBUTION. Great Britain, West Germany, East Germany.

Additional records. France (Lhomme, [1946]: 624); Denmark (Karsholt, 1985: 65); Sweden, Finland (Klimesch, 1954: 281); Poland (Schille, 1931: 183).

MATERIAL EXAMINED (including 3 ♂, 2 ♀ genitalia preparations)

Lectotype ♂ (*fraternella*), **Great Britain**: England, [London,] Lewisham, 5.viii.1849 (*Stainton*) (BMNH). Holotype ♂ (*intermediella*), **Great Britain**: England, Witherslack, ix.1896 (*Hodgkinson*) (genitalia slide no. 24614; BMNH).

Great Britain: 9 ♂, 2 ♀, England, Kent, Bromley, 1–10.vii.1934, 17.vii.1937, 26.vii.1945 (*Jacobs*); 1 ♂ (*fraternella* paralectotype), [London,] Lewisham, 2.viii.1850 (*Stainton*); 10 ♂, 8 ♀, [Norfolk,] Merton,

vi.1885, 4.viii.1887, 3.viii.1888, 28.vii.1889, 7.viii.1890, 6, 12.vii.1893, 28.vii.1891 e.l. (larva on *Cerastium semidecandrum*), 25.vii.–6.viii.1891 e.l. (larvae on *Stellaria holostea*); 2 ♀, [Cambridgeshire,] Wicken (*Machin*); 1 ♀, Yorkshire, Blubberhouses, 3.viii.1919 (*Walsingham*). **Germany (West)**: 1 ♂, 1 ♀, [Bavaria,] Kelheim, 3.vii., 2.viii. e.l. (larvae on *Cerastium arvense*) (*Hofmann*). **Germany (East)**: 1 ♂, Dresden (*Tischer*) (all BMNH). No locality data: 8 ♂, 11 ♀.

The *interalbicella*-group

Genitalia ♂. Uncus long, narrow, smooth. Tegumen very broad anteriorly, strongly constricted medially; pedunculi large. Transtilla with a few to numerous spines. Valva usually long and slender, strongly bent near base therefore distal part almost parallel to posterior margin of vinculum; apex frequently bulged with brush of setae. Sacculus well developed, usually knife-shaped. Posterior margin of vinculum almost straight, medially with small incision to broad V-shaped emargination. Saccus slender to moderately broad. Aedeagus without cornuti.

Genitalia ♀. Eighth segment with pair of rod-like, flap-shaped or digitate ventral or dorsal processes; ventromedial area sclerotized, occasionally with numerous microtrichia. Antrum a short ring or long funnel. Ductus bursae occasionally with pair of small posterior sclerites. Signum with well-developed hook.

Biology. Host-plants: Alsinoideae (*Moehringia*, *Stellaria*, *Cerastium*).

Caryocolum klosi (Rebel, 1917)

(Figs 73, 74, 143, 206)

Gelechia klosi Rebel, 1917: 30. Lectotype ♂, Austria (NM), here designated [examined].
Gelechia klosi Rebel; Galvagni, 1924: 101; Meyrick, 1925: 77.
Caryocolum klosi (Rebel) Sattler, 1960*a*: 68; Reichl & Gusenleitner, 1968: 66.
Phthorimaea klosi (Rebel) Klimesch, 1961: 665.
Caryocolum sp.; Süssner, 1966: 101.

Adult (Figs 73, 74). ♂, 6·5–8·0 mm, ♀, 6·5–7·5 mm. Vertex grey; frons silvery white. Second segment of labial palpus cream, mottled with dark brown on outer surface. Thorax and tegula dark brown, somewhat lightened distally. Sternal region of abdomen dark brown. Fore wing dark brown mottled with whitish; scattered ochreous scales, particularly along fold; irregular white transverse fasciae from fold to costa at one-fifth and one-half. Black markings: costal spot at base, discal spots, patch distad of cell. White costal and tornal spots separate. Base of fringes with series of white dots from costa to tornus.

Genitalia ♂ (Fig. 143). Transtilla weakly sclerotized with a few spines. Valva long, broad at base, distal part slightly tapered to projected apex. Sacculus digitate. Posterior margin of vinculum slightly incised medially; indistinct lateromedial projection, lateral part slightly projected. Saccus with basal half moderately broad, distal half slender. Anellus with pair of small pegs.

Genitalia ♀ (Fig. 206). Eighth segment with pair of rod-like longitudinal dorsal sclerotizations; ventral part medially membranous. Antrum tubular, short, about one-third length of apophyses anteriores. Signum: large base with large, strongly bent hook, short teeth developed basally.

Remarks. Externally *C. klosi* is very similar to *cassella*, particularly specimens from the Schwarzwald (West Germany), but differs in the dark colour of the sternal region of the abdomen, the rounded apex of the hind wing and in the genitalia. It closely resembles *interalbicella* and *nearcticum* in genital characters but is distinguished by the shape of the valva which is broader than in *interalbicella* and distinctly longer than in *nearcticum*. Furthermore it differs in the posterior margin of the vinculum, the shape of the saccus and the signum.

Specimens from south Germany (Württemberg, Schwarzwald) (Fig. 74) are darker in the ground-colour of the fore wing than those from Austria. This may reflect a geographic difference; however, the material from Germany is freshly emerged whereas the specimens I have examined from Austria are rather worn.

G. klosi was described from 5 ♂, 1 ♀ collected in Austria (Steiermark, Kärnten) by Höfner and Prohaska. I have examined 2 ♂ syntypes one of which is here designated as lectotype.

Biology. Host-plant: *Stellaria nemorum* L. (coll. Süssner).

The larvae feed in April between spun shoots and have been found in shady forests about two weeks earlier than those of *cassella*, which often occur in the same localities. Moths have been bred in the second half of May. In the wild adults were collected from late June to late July.

DISTRIBUTION. France, West Germany, Austria.
Additional record. Rumania (Gozmány, 1953: 181).

MATERIAL EXAMINED (including 14 ♂, 11 ♀ genitalia preparations)
Lectotype ♂, **Austria**: Steiermark ('Styria'), [Hoch]lantsch, 11.vii.1916 (*Prohaska*) (NM).
France: 1 ♀, Alpes-Maritimes, Peira-Cava, 4800 ft, 22.vii.1911 (*Walsingham*) (BMNH). **Germany (West)**: 1 ♂, Oberfranken, Hof/Saale, E. vii.1960 (*Pröse*) (coll. Pröse, Hof/Saale); 2 ♂, 1 ♀, Württemberg, Schwarzwald, Wildbad, 530–550 m, e.l. 18.v.1972, e.l. 20–21.v.1976 (*Stellaria nemorum*) (*Süssner*) (coll. Pröse, Hof/Saale; TLMF); 3 ♂, 4 ♀, Württemberg, Schwarzwald, Sprollenmühle, 560–600 m, e.l. 14–27.v.1968 (*Süssner*) (BMNH; TLMF); 2 ♂, Schwarzwald, Sprollenhaus, 21.vi.1959, e.l. 15.v.1968 (*Süssner*) (BMNH; TLMF). **Austria**: 1 ♂ (paralectotype), Kärnten, Rossinggraben near Wolfsberg, 8.vii.1889 (*Höfner*) (NM); 1 ♂, 1 ♀, Ober-Österreich, Böhmer Wald, Holzschlag, 22.vii.1965 (*Klimesch*) (coll Klimesch, Linz).

Caryocolum interalbicella (Herrich-Schäffer, 1854).

(Figs 75, 144, 207)

Gelechia interalbicella Herrich-Schäffer, 1854: 187, LECTOTYPE ♂, SWITZERLAND (MNHU), here designated [examined].
Tinea quadrella Fabricius, 1794: 298. LECTOTYPE ♀, EUROPE (ZM), here designated [not examined] [selected by Pitkin & Sattler]. [Junior primary homonym of *Tinea quadrella* [Denis & Schiffermüller], 1775 (= *Platytes cerusella* ([Denis & Schiffermüller], 1775)) (Pyralidae: Crambinae).]
Lita delphinatella Constant, 1890*b*: 6, pl. 1, fig. 2. Holotype ♂, FRANCE: Alpes du Dauphine, vii (?MNHN) [not traced].
Phthorimaea delphinatella (Constant) Meyrick, 1925: 95.
Gnorimoschema interalbicellum (Herrich-Schäffer) Klimesch 1954: 282, figs 18–20.
Caryocolum interalbicellum (Herrich-Schäffer) Sattler, 1960*a*: 68.
Caryocolum delphinatella (Constant) Leraut, 1980: 79.

ADULT (Fig. 75). ♂, 7·0–8·0 mm, ♀, 6·0–7·5 mm. Head whitish to cream. Labial palpus whitish flecked with dark brown on outer surface. Thorax dark brown; mesoscutellum whitish, three black spots distally; tegula white at apex. Sternal region of abdomen whitish. Fore wing dark brown with scattered ochreous scales; dorsal margin mottled with white; indistinct whitish fasciae from fold to costa at one-fifth and one-half; black spot in fold at one-quarter, further black subcostal spots in middle and distad of cell. White costal and tornal spots separate.

GENITALIA ♂ (Fig. 144). Transtilla weakly sclerotized with some spines. Valva long, broad base, slightly tapered distal part. Sacculus short, digitate. Posterior margin of vinculum slightly incised medially, indistinct lateromedial projection; laterally straight. Saccus slender, medial part slightly broadened.

GENITALIA ♀ (Fig. 207). Eighth segment with pair of rod-like longitudinal dorsal sclerotizations, ventral part medially membranous. Antrum tubular, very short, about one-fifth length of apophyses anteriores. Signum: medium-sized hook without additional teeth.

REMARKS. *C. interalbicella* is externally similar to *klosi* but differs in the white head, white sternal region of the abdomen, more lanceolate shape of the fore wing and pointed apex of the hind wing. It sometimes resembles *fiorii* in fore wing pattern and colour but is distinguished by the dark brown thorax. *C. interalbicella* closely resembles *klosi* in genital characters but differs in the more slender valva, the less projected posterior margin of the vinculum and the smaller antrum and signum.

T. quadrella was described from an unspecified number of specimens. A female syntype was examined by Karsholt (genitalia slide no. 4219 Karsholt) and subsequently by Pitkin and Sattler. This specimen is here designated as lectotype.

G. interalbicella was described from 1 ♂, 1 ♀ collected in Switzerland by Frey and Anderegg. I have examined two male specimens from the Herrich-Schäffer collection which were labelled 'Origin[al]' by Staudinger. Despite the discrepancy in the sex of one specimen they probably are syntypic. One of these specimens is here designated as lectotype.

BIOLOGY. Host-plant: *Cerastium arvense* L. (Burmann, 1954: 203).

Almost fully grown larvae have been found at high altitudes from mid-April to early May. They feed on young shoots into which they occasionally bore. Moths emerged from late May to mid-June (Burmann, 1954: 202). Adults have been collected from late June to late August. They occur particularly near rocky walls from about 600–2000 m.

DISTRIBUTION. Alps: France, West Germany, Switzerland, Austria, Italy.

A record from Corsica (Rebel, 1901: 144) is most probably a misidentification of the somewhat similar *Chionodes apolectella* (Walsingham).

Vives Moreno (1985: 13) records *interalbicella* from Spain, but it seems likely that this record refers to *fibigerium* which has been misidentified as *interalbicella* in the past.

MATERIAL EXAMINED (including 8 ♂, 4 ♀ genitalia preparations)

Lectotype ♂ (*interalbicella*), **Switzerland** (MNHU).

France: 2 ♂, 1 ♀, Basses Alpes, Maurin, 3–10.viii.1932 (*Fassnidge*) (BMNH). **Germany (West)**: 1 ♂, Südbayern, Leutstetten, 590 m, A.vii.1971 (*Zürnbauer*) (TLMF). **Switzerland**: 1 ♂, 3 ♀, Pontresina, 27.vii.–1.viii.1870, vii.1911; 1 ♀, St. Luc, 5.viii.1965 (*Jacobs*); 4 ♂, 2 ♀, Wallis, Saas Fee, 13–14.vii.1959 (*Jacobs*); 1 ♀, Graubünden, Bergün, 30.vii.1873; 9 ♂, 2 ♀, Engadin, 27–29.vi.1863 (BMNH); 1 ♂ (*interalbicella* paralectotype) (MNHU). **Austria**: 3 ♂, Tirol, Vennatal, 1500–2000 m, 22.vi.1943, 14.vii.1943, 9.vii.1950 (*Burmann*) (coll. Burmann, Innsbruck); 1 ♀, Tirol, Vennatal, 1400 m, 26.vi.1966 (*Hernegger*) (TLMF). **Italy**: 1 ♀, Prov. Bolzano, Schnalstal, 1800 m, 23.vii.1983 (*Skule & Skou*) (ZM); 1 ♀, Schnalstal, 800 m, E. viii.1967 (*Zürnbauer*) (TLMF); 5 ♂, 6 ♀, Stelvio (*Frey*); 1 ♂, Franzenshöhe; 5 ♂, 1 ♀, Südtirol (*Staudinger*) (BMNH). No locality data: 18 ♂, 4 ♀.

Caryocolum laceratella (Zeller, 1868) **comb. n.**

(Figs 76, 145)

Gelechia laceratella Zeller, 1868*a*: 143. LECTOTYPE ♂, ITALY (Friuli) (BMNH), here designated [examined].

Lita thurneri Pinker, 1953: 180, figs 1, 2. LECTOTYPE ♂, ITALY (Friuli) (NM) [designated by Povolný, 1968*b*: 19, as holotype] [examined]. **Syn. n.**

Gnorimoschema thurneri (Pinker); Klimesch, 1954: 284, figs 21a, 21b.

Caryocolum thurneri (Pinker); Povolný, 1968*b*: 19, pl. 17, fig. 79, pl. 19, fig. 2.

ADULT (Fig. 76). ♂, 7·5–8·5 mm. Head white. Labial palpus white, second segment speckled with light brown scales on outer surface. Thorax and tegula as head, scattered with light brown; mesoscutellum with three dark apical dots. Fore wing whitish, mottled with ochre-brown; two black stripes, irregularly extended from fold towards costa near base and first quarter; arrow-like black spot distad of cell, indistinctly extended towards costa. Apex of fore wing with ochreous to dark brown patch. White costal and tornal spots usually confluent, forming a broad fascia, rarely separated by ochreous stripe. Base of fringes with series of blackish dots.

GENITALIA ♂ (Fig. 145). Transtilla pear-shaped with numerous spines. Valva short, broad, distal part slightly broader than middle, apex with dorsal projection. Sacculus digitate, slightly pointed. Posterior margin of vinculum straight, without projection. Saccus slender, gradually tapered.

GENITALIA ♀. Unknown.

REMARKS. *C. laceratella* is easily recognized by its fore wing pattern. In the male genitalia the shape of the valva is a diagnostic structure.

G. laceratella was described from 3 ♂ collected by Zeller in Italy. A single specimen already labelled 'lectotype' by Sattler is here designated as such.

According to information in the article by Pinker to which the original description is appended, *Lita thurneri* was described from two specimens from Montasio collected as adults in 1951, a further specimen from that locality bred from a pupa in 1952, and a female from Triglav. As no holotype was formally designated in the original description, Pinker's 'types' and 'paratypes' ('Typen und Paratypen') have the status of syntypes and Povolný's subsequent reference to a holotype (Povolný, 1968*b*: 19, pl. 17, fig. 79, pl. 19, fig. 2) constitutes a valid lectotype designation. The lectotype ♂ and the reared 'paratype' ♂ from Montasio were available to me, whereas the third specimen from that locality has not been traced. The lectotype is labelled 'e.l. ix.1951' although only one specimen was reared (in 1952) according to the original publication. The 'paratype' ♀ from Triglav, examined and illustrated by Povolný (1966: 394, fig. 3; pl. 8, fig. 27), is a dark specimen of *Gnorimoschema hoefneri* (Rebel). Following the examination of that specimen Povolný erroneously synonymized *thurneri* with *hoefneri*, which he tentatively placed as a subspecies of *Gnorimoschema streliciella* (Herrich-Schäffer); subsequently he re-instated *thurneri* as a *Caryocolum* species (Povolný, 1968*b*: 19).

BIOLOGY. Pinker (1953: 181) found the pupae from the end of August to mid-September in close proximity

of *Moehringia ciliata* (Scop.) Dalla Torre, which is probably the host-plant. Moths have been caught from late July to mid-September.

DISTRIBUTION. Italy (Friuli).

MATERIAL EXAMINED (including 4 ♂ genitalia preparations).

Lectotype ♂ (*laceratella*), **Italy**: [Friuli, Alpi Giulie] Cave del Predil ('Raibl'), 25.vii.1867 (*Zeller*) (BMNH). Lectotype ♂ (*thurneri*), **Italy**: [Friuli, Alpi Giulie] Montasio ('Montasch') [1800 m], e.l. [17.?] ix.1951 (*Pinker*) (genitalia slide no. 174/75; NM).

Italy: 2 ♂ (*laceratella* paralectotypes), [Friuli, Alpi Giulie] Cave del Predil ('Raibl'), 23.vii.1867, 1867 (*Zeller*) (BMNH); 1 ♂ (*thurneri* paralectotype), [Friuli, Alpi Giulie] Montasio ('Montasch'), e.l. viii.1952 (*Pinker*) (NM).

Caryocolum nearcticum sp. n.

(Figs 77, 146)

ADULT (Fig. 77). ♂, 5·0–5·5 mm. Head dark grey, shiny; frons paler. Second segment of labial palpus whitish, mottled with dark brown on outer surface; third segment dark brown. Thorax and tegula as head. Fore wing dark grey-brown regularly mottled with light scales; without distinct markings. White tornal spot at four-fifths, costal spot reduced.

GENITALIA ♂ (Fig. 146). Uncus short. Transtilla weakly sclerotized with some spines. Valva short, broad, distally tapered. Sacculus broad, spatula-shaped, shorter than valva. Posterior margin of vinculum slightly incised medially with pair of short lateral projections. Saccus broad at base, gradually tapered.

GENITALIA ♀. Unknown.

REMARKS. *C. nearcticum* is characterized by the almost unicolorous fore wings and the reduction of the costal spot at four-fifths. It closely resembles *klosi* in genital characters but differs in the distinctly shorter uncus and valva and the shape of the latter.

BIOLOGY. Host-plant unknown. Moths have been collected from late July to early September.

DISTRIBUTION. U.S.A. (California, Washington).

MATERIAL EXAMINED (including 2 ♂ genitalia preparations)

Holotype ♂, **U.S.A.**: California, Siskiyou Mts, Sheep Rock, 13.ix.1871 [91053] (*Walsingham*) (genitalia slide no. 24600; BMNH).

Paratype. **U.S.A.**: 1 ♂, Washington, Yakima Co., 2·5 mi W. Ft Simcoe, 31.vii.1962 (*Clarke*) (NMNH).

Caryocolum blandella (Douglas, 1852)

(Figs 78, 147, 208)

Gelechia blandella Douglas, 1852*a*: 246. LECTOTYPE ♀, GREAT BRITAIN: England (BMNH), here designated [examined].

Gelechia blandella Douglas; Douglas, 1852*b*: 77, pl. 10, figs 2, 2a, 2c.

[*Recurvaria maculea* Haworth, 1828: 552. Unjustified emendation of *Tinea maculella* Fabricius (= *Prays fraxinella* (Bjerkander)). Misidentification.]

[*Anacampsis maculea* (Fabricius) Stephens, 1829: 214. Unjustified emendation of *Tinea maculella* Fabricius. Misidentification.]

[*Anacampsis maculella* (Fabricius) Stephens, 1835: 214. Misidentification.]

[*Gelechia maculea* (Haworth) Stainton, 1854: 123. Misidentification.]

[*Lita maculea* (Haworth) Heinemann, 1870: 262; Benander, 1928: 78, pl. 6, fig. 26. Misidentifications.]

[*Phthorimaea maculea* (Haworth) Meyrick, 1925: 95. Misidentification.]

[*Gnorimoschema maculeum* (Haworth) Klimesch, 1954: 285, figs 24, 25. Misidentification.]

[*Caryocolum maculeum* (Haworth) Gozmány, 1958: 201. Misidentification.]

Caryocolum blandella (Douglas); Bradley, Fletcher & Whalley, 1972: 23; Karsholt, 1981: 225, figs 3, 15, 16, 24.

ADULT (Fig. 78). ♂, ♀, 5·5–6·5 mm. Head whitish, mottled with cream. Labial palpus whitish; flecked with dark brown, particularly on outer surface of second and third segment. Thorax and tegula white mottled with cream, dark brown basally. Fore wing whitish with scattered orange-brown scales; mottled grey-brown, particularly along costa and at apex; broad black streak from fold to costa at one-quarter,

rarely broken; black discal spot in middle, black comma-shaped subcostal streak distad of cell. White costal and tornal spots at four-fifths separated by orange-brown scales or confluent, forming a fascia.

Genitalia ♂ (Fig. 147). Transtilla with numerous spines. Valva long, slender, narrowing medially; apex with rounded bulge. Sacculus slender, knife-shaped, pointed. Posterior margin of vinculum slightly projected with short medial incision. Saccus broad at base, gradually tapered. Anellus with pair of small pegs.

Genitalia ♀ (Fig. 208). Eighth segment with pair of broad, digitate dorsal processes, pointing laterally; ventral zone a large sclerotized ovate plate, almost extended to posterior margin of eighth segment; apophysis anterior about twice as long as eighth segment; apophysis posterior 3–4 times length of anterior. Antrum a moderately short ring, anterior and posterior margins emarginated. Posterior part of ductus bursae with indistinct sclerotized plate and pair of tiny lateral sclerites. Signum: slender slightly bent hook.

Remarks. *C. blandella* is externally similar to *blandulella*, *proximum*, *blandelloides* and *kroesmanniella*. It differs from the first two species by its larger size and the extension of the orange-brown mottling and from *proximum* in the lighter colour of the head. The fore wing markings contrast more with the pale ground colour than in *blandelloides* and *kroesmanniella* and the black streak at one-quarter is usually not divided.

C. blandella is very similar to *horoscopa* and *blandelloides* in genital characters. It differs from the former in the longer valva and the white rather than grey ground colour of the fore wing, from the latter in the rounded bulge of the valva, the larger antrum and further minute characters such as the shape of the saccus and the processes of the eighth female segment.

Haworth described this species as *Recurvaria maculea* which was both an unjustified emendation and a misidentification of *Tinea maculella* Fabricius (= *Prays fraxinella* (Bjerkander)). Subsequently many authors perpetuated this error.

The name *blandella* originated from Fischer von Roeslerstamm but was made nomenclaturally available by Douglas. *G. blandella* was described from an unspecified number of specimens; I have examined 3 ♂, 3 ♀ syntypes, and a female is here designated lectotype.

Biology. Host-plant: *Stellaria holostea* L (Douglas, 1852*b*: 77). According to Wörz (1954: 129) also on '*Alsine media*' (? = *Stellaria media* (L.) Vill.); however, this record needs confirmation.

The larvae mine the leaves during early spring, later feeding between spun shoots and finally within the seed-capsules. They are fully grown in early June (Stainton, 1867: 90; Karsholt, 1981: 257). According to Schütze (1931: 92) the larva also feeds in flower-buds. Moths have been caught from early July to mid-September. Schütze (loc. cit.) records hibernating adults, an observation which is most probably based on a misidentification of *junctella*.

Distribution. Great Britain, France, West Germany, Austria.

Additional records. Denmark, Sweden, Finland (Karsholt, 1981: 257); Norway (Opheim, 1978: [14]) [according to Karsholt, loc. cit., doubtful]; Netherlands (Snellen, 1882: 658); Belgium (Lhomme, [1946]: 624); Ireland (Klimesch, 1961: 655); Switzerland (Müller-Rutz, 1914: 491); East Germany (Rapp, 1936: 114); Poland (Schille, 1931: 183); Italy (Klimesch, 1954: 285); Yugoslavia (Rebel, 1931: 147); U.S.S.R. (European part) (Piskunov, 1981: 686).

Klimesch (1961: 624) mentions this species from Albania, a record which refers probably to Rebel (1931). However, Rebel's locality 'Novoselo' is part of today's Yugoslavia.

A record from Mongolia as *Caryocolum* close to *blandella* (Povolný, 1973: 17, fig. 8, pl. 5, fig. 17) requires further investigation.

Material examined (including 3 ♂, 4 ♀ genitalia preparations)

Lectotype ♀, **Great Britain**: England (BMNH).

Great Britain: 3 ♂, 2 ♀ (paralectotypes) England; 1 ♂, Sussex, Selham, 8.viii.1935 (*Fassnidge*); 3 ♂, 9 ♀, Strete nr Dartmouth, 11–28.viii.1900, 29.viii.–1.ix.1901 (*Bankes*); 8 ♂, Kent, Bexley, e.l. vi–vii.1935 (*Ford*); 2 ♂, 1 ♀, Sommerset, Stogumber, 6.viii.1943, viii.1945 (*Jacobs*); 3 ♂, 1 ♀, Ramsbury, 28.vii.1887, 26.viii.1888, 12.viii.1891, 29.viii.1902 (*Meyrick*) (BMNH). **France**: 2 ♂, 2 ♀, Alpes-Maritimes, Peira-Cava, 4800 ft, 6–21.viii.1911 (*Walsingham*); 1 ♀, Ariège, Auzat, 1.viii.–11.ix.1927 (*Fassnidge*); 1 ♀, Hautes Pyrénées, Luz, 1.viii.–15.ix.1926 (*Fassnidge*); 6 ♂, 3 ♀, Paris, 1900; 1 ♀, Pyrénées-Orientales, Prades, Villerach, 31.vii.1981 (*Sattler, Tuck, Robinson*) (BMNH). **Germany (West)**: 2 ♂, Württemberg, Beilstein, St Anna-See, e.l. 2.vii.1968 (*Süssner*) (TLMF); 1 ♀, Hamburg, viii.1898; 4 ♀, Hannover, e.l. 13.vii.1864 (*Stellaria holostea*) (*Glitz*); 1 ♂, 1 ♀, Franken (*Hartmann*); 1 ♂, Helmstedt (*Heinemann*); 1 ♂, 3 ♀, Markt Steft (*Hofmann*) (BMNH). **Austria**: 3 ♀, Wien, viii (*Mann*) (BMNH).

Caryocolum blandelloides Karsholt, 1981

(Figs 79, 148, 209)

Caryocolum blandelloides Karsholt, 1981: 252, figs 1, 2, 13, 14, 23. Holotype ♂, DENMARK: NEJ, Laesø, Bovet, 6–9.vii.1979 (Karsholt) (ZM) [not examined].
[*Gelechia maculiferella* (Douglas); Tengström, 1869: 344. Misidentification.]
[*Lita maculiferella* (Douglas); Larsen, 1927: 95 (partim). Misidentification.]

ADULT (Fig. 79). ♂, 4·5–6·0 mm, ♀, 4·0–5·5 mm. Head whitish; neck mottled with brown. Second segment of labial palpus whitish on inner surface, outer surface cream flecked with brown; third segment dark brown mottled with white. Thorax and tegula whitish speckled light and dark brown. Fore wing whitish, flecked with orange-brown and grey; dark brown along costa and at apex; black stripe from fold to costa at one-quarter, usually separated by orange-brown; black discal spot in middle; black comma-shaped subcostal streak distad of cell, sometimes extended towards tornus; black markings frequently lined with orange-brown. White costal and tornal spots separated by orange-brown patch or confluent, forming a fascia.

GENITALIA ♂ (Fig. 148). Transtilla with numerous spines. Valva long, slender, narrowing medially, apex with triangular bulge. Sacculus knife-shaped, pointed. Posterior margin of vinculum almost straight with short medial incision. Saccus broad at base, gradually tapered. Anellus with pair of small pegs.

GENITALIA ♀ (Fig. 209). Eighth segment with pair of broad, short digitate dorsal processes, pointing laterally; ventral zone a large sclerotized ovate plate, extending slightly beyond posterior margin of eighth segment; apophysis anterior twice as long as segment; apophysis posterior about 3 times length of anterior. Antrum a short ring, anterior and posterior margins emarginated. Posterior part of ductus bursae with sclerotized plate and pair of tiny sclerites. Signum: a slender, slightly bent hook.

REMARKS. *C. blandelloides* resembles *blandella*, *proximum*, *blandulella*, *huebneri* and *kroesmanniella* externally. It usually differs from the first three species in having a black streak at one-quarter, which is divided by orange-brown scales. *C. blandelloides* differs further from *blandella*, *huebneri* and *proximum* in the extension of dark fuscous scales.

C. blandelloides closely resembles *blandella* in genital characters, but differs in the triangular apex of the valva, distinctly shorter antrum and shorter processes of the eighth segment. It is easily distinguished from the above-mentioned species by the shape of the valva, the process of the female eighth segment and the antrum.

C. blandelloides was recently described by Karsholt from a series of 116 ♂, 11 ♀. It has often been misidentified as '*maculiferella*'.

BIOLOGY. Host-plant: *Cerastium arvense strictum* (Haenke) Gaudin (coll. Klimesch, Linz).

In Denmark the host-plant is assumed to be *Cerastium semidecandrum* L. (Karsholt, 1981: 255).

Klimesch found the larvae in mid-June, feeding within the flowers. They pupated on the ground and moths emerged from late July to early August. In their natural habitats such as coasts and alpine scree, adults have been collected in July and August.

DISTRIBUTION. Spain, Denmark, Sweden, Austria, Corsica.

Additional records. Norway, Finland, U.S.S.R. (European part) (Karsholt, 1981: 255).

MATERIAL EXAMINED (including 4 ♂, 4 ♀ genitalia preparations)

Spain: 2 ♂, Granada prov., Sierra Nevada, Ruta del Veleta, 1900 m, 24.viii.1984 (*Kavin & Skou*) (ZM). **Denmark**: 2 ♂ (paratypes), NEJ, Laesø, Bovet, 6–9.viii.1979 (*Karsholt*) (ZM); 3 ♂ (paratypes), NEJ, Laesø, Østerby, 31.vii.–10.viii.1979 (*Karsholt*) (ZM; BMNH). **Sweden**: 3 ♂, 3 ♀ (paratypes), Öl, Seberneby, 19–23.vii.1975 (*Karsholt*) (ZM; BMNH). **Austria**: 1 ♂, 2 ♀, Ober-Österreich, Almsee, e.l. 22.vii.1968, e.l. 22.vii.1977, e.l. 30.vii.1978 (*Cerastium strictum*) (*Klimesch*) (coll. Klimesch, Linz). **Corsica**: 1 ♂, C. de Bavella, 1200 m, 21.vii.1928 (*Reisser*) (NM).

Caryocolum horoscopa (Meyrick, 1926) **comb. n.**

(Figs 80, 149)

Phthorimaea horoscopa Meyrick, 1926: 279. Holotype ♂, INDIA (Kashmir) (BMNH) [examined].
Gnorimoschema horoscopa (Meyrick) Clarke, 1969: 155, pl. 77, figs 4, 4a, 4b.

ADULT (Fig. 80). ♂, 5·0–6·0 mm. Head mottled greyish brown; frons whitish. Labial palpus dark brown, first and second segment white on inner surface. Thorax and tegula as head. Fore wing grey densely

speckled with white; black streak from fold to costa at one-quarter; black medial spot costad of cell; black comma-shaped spot distad of cell at three-fifths. Markings sometimes lined with orange-brown. Indistinct, slightly angled white fascia at four-fifths.

Genitalia ♂ (Fig. 149). Transtilla with numerous spines. Valva longer than sacculus, slightly narrowing medially; distal part with rounded bulge. Sacculus knife-shaped. Posterior margin of vinculum slightly projected with short medial incision. Saccus broad at base, gradually tapered. Anellus with pair of small pegs.

Genitalia ♀. Unknown.

Remarks. *C. horoscopa* is similar to *proximum* externally but may be distinguished by the grey rather than brown colour of the fore wing and the less constricted medial part of the valva in the male. Externally *C. horoscopa* differs from the closely related *blandella* in the grey rather than white colour of the fore wing, but both are almost indistinguishable in genital characters; the only significant difference I could find is the shorter valva of *horoscopa*.

Biology. Host-plant unknown. Moths have been collected from July to early August between 1600 m and 3000 m.

Distribution. India (Kashmir), Afghanistan.

Material examined (including 3 ♂ genitalia preparations)
Holotype ♂, **India**: Kashmir, Srinagar, 5200′, vii.1923 (*Fletcher*) (genitalia slide no. 8310 J.F.G.C.; BMNH).
Afghanistan: 3 ♂, Band-i-Amir, 3000 m, 30.vii.1963 (*Kasy & Vartian*); 1 ♂, 30 km NW. of Kabul, Paghman, 2200 m, 3.viii.1963 (*Kasy & Vartian*) (NM).

Caryocolum jaspidella (Chrétien, 1908)

(Figs 81, 210)

Lita jaspidella Chrétien, 1908*a*: 231. Holotype ♀, Algeria (MNHN) [examined].
Phthorimaea jaspidella (Chrétien) Meyrick, 1925: 96.
Caryocolum jaspidellum (Chrétien) Povolný, 1983: 176, figs 18, 19.

Adult (Fig. 81). ♀, 4·5 mm. Head mid-brown, mottled with pale; frons white. Second segment of labial palpus whitish mottled with mid-brown on outer surface; third segment dark brown, flecked with white. Thorax and tegula whitish speckled mid-brown, basal half predominantly brown. Fore wing mid- to dark brown mottled with white, particularly near base and across middle; transverse blackish fasciae at one-fifth; black dot medially; black comma-shaped subcostal streak distad of cell; orange-brown patch distad of cell. White costal and tornal spots confluent, forming a fascia.

Genitalia ♂, Unknown.

Genitalia ♀ (Fig. 210). Eighth segment with pair of digitate ventrolateral processes, pointing medially; ventral zone with ovate sclerotization; apophysis anterior 1·5 times length of eighth segment; apophysis posterior about 3·5 times length of anterior. Antrum short, ring-shaped, posteriorly and anteriorly emarginated. Signum a long, stout, slightly bent hook.

Remarks. *C. jaspidella* is similar to *fibigerium* externally but differs in the lighter colour of the head and thorax. In genitalia it closely resembles *proximum* but differs in the larger signum which is also of a different shape.

This species was described from a single specimen and the genitalia suffered some damage during preparation. However, it is obvious that *jaspidella* is closely related to *proximum* and it was correctly placed near the latter species by de Joannis.

Biology. Host-plant unknown. The single specimen was collected in late August at about 750 m.

Distribution. Algeria.

Material examined (including 1 ♀ genitalia preparation)
Holotype ♀, **Algeria**: [St. Croix, below Edough Mt, 750 m, E.viii.]1907 (*Lesne*) (unnumbered genitalia slide by Povolný; MNHN).

Caryocolum proximum (Haworth, 1828)

(Figs 82, 150, 211)

Recurvaria proxima Haworth, 1828: 552. LECTOTYPE ♀, GREAT BRITAIN: England (BMNH), here designated [examined].
Anacampsis proxima (Haworth) Stephens, 1835: 212.
Gelechia maculiferella Douglas, 1851: 102. [Unnecessary objective replacement name for *Recurvaria proxima* Haworth which is not an emendation of *Tinea proximella* Hübner, 1796.]
[*Gelechia alsinella* Zeller, 1868*a*: 145 (partim). Misidentification.]
Lita maculiferella (Douglas) Heinemann, 1870: 263; Benander, 1928: 78, pl. 6, fig. 39.
Gelechia horticolla Peyerimhoff, 1871: 411. Type(s), FRANCE [not traced]. [Synonymized by Peyerimhoff, 1871: 411.]
Phthorimaea maculiferella (Douglas) Meyrick, 1925: 90.
Gnorimoschema maculiferellum (Douglas) Klimesch, 1954: 284, fig. 22 [fig. 23 is a misidentification of *alsinella*].
Caryocolum maculiferellum (Douglas) Gozmány, 1958: 206.
Caryocolum proximum (Haworth); Bradley, Fletcher & Whalley, 1972: 23.
Caryocolum proxima (Haworth); Karsholt, 1981: 258, figs 4, 17, 18, 25, 26.

ADULT (Fig. 82). ♂, 4·5–5·5 mm, ♀ 4·5–5·0 mm. Head mid-brown, mottled with white; frons white. Second segment of labial palpus white, outer surface mottled with brown; third segment blackish. Thorax and tegula as head. Fore wing whitish, flecked with mid-brown. Black markings: broad patch from fold to costa at one quarter; medial spot; comma-shaped subcostal spot distad of cell. Markings lined with orange-brown. Whitish costal and tornal spots indistinct.

GENITALIA ♂ (Fig. 150). Transtilla with numerous spines. Valva slightly longer than sacculus, strongly narrowing medially, distal part with rounded bulge. Sacculus knife-shaped. Posterior margin of vinculum slightly projected with short medial incision. Saccus broad at base, gradually tapered. Anellus with pair of small pegs.

GENITALIA ♀ (Fig. 211). Eighth segment with pair of digitate ventrolateral processes, pointing medially; ventral region with ovate sclerotization, not extending to posterior margin of eighth segment; apophysis anterior 1·5 times length of eighth segment; apophysis posterior about 3·5 times length of anterior. Antrum ring-shaped, short, posteriorly and anteriorly emarginate. Signum a short, stout hook.

REMARKS. Externally *C. proximum* is similar to *horoscopa*, *junctella*, *blandella*, *blandulella*, *blandelloides* and *alsinella*. It differs from *junctella* in the strongly contrasted black patch at one-quarter, which is usually broader than in other *Caryocolum* species. From the other above-mentioned species it differs in genital characters such as the shape of the valva, process of the eighth segment of the female and the antrum. It is distinguished from the closely related *blandella* and *horoscopa* by the more distinctly narrowing valva and from *jaspidella* by the shape of the signum.

R. proxima was described from an unspecified number of specimens. The single female syntype which is still present in the Haworth collection is here designated lectotype.

G. maculiferella was proposed by Douglas as a replacement name for *proxima*. However, Haworth did not refer to *T. proximella* Hübner in the original description as presumed by Douglas. Therefore *proxima* is not an emendation of *proximella* and *maculiferella* is an unnecessary replacement name.

BIOLOGY. Host-plants: *Stellaria media* (L.) Vill. (Karsholt, 1981: 258); *Cerastium fontanum* (Bradford, [1979]: 128).

Records of *C. semidecandrum* L. as a host-plant (e.g. Stainton, 1867: 154) refer to *alsinella*. Lhomme ([1946]: 626) erroneously records larvae on *Crataegus monogyna*; however, moths are frequently found flying around hawthorn.

According to Bradford ([1979]: 128) larvae occur in May and feed on flowers and seeds. Adults have been collected from late June to the middle of September, but mainly in August.

DISTRIBUTION. Great Britain, France, West Germany, Poland, Austria, Italy, Greece, U.S.A.

Additional records. Denmark (Karsholt, 1981: 259); Netherlands (Lempke, 1976: 26); East Germany (Rapp, 1936: 114); Switzerland (Müller-Rutz, 1914: 491); Hungary (Karsholt, 1981: 259); Sardinia (Mariani, 1943: 169); Yugoslavia (Klimesch, 1968: 125); Albania (Rebel, 1931: 147); Rumania (Caradja, 1920: 101); U.S.S.R. (European part) (Klimesch, 1954: 284).

This species has frequently been misidentified and records from Scandinavia are erroneous (Karsholt, 1981: 259).

MATERIAL EXAMINED (including 4 ♂, 3 ♀ genitalia preparations)

Lectotype ♀ (*proxima*), **Great Britain**: England [Haworth coll.] (BMNH).

Great Britain: 51 ♂, 6 ♀, England, [London,] Lewisham, 12–16.viii.1882, 13–25.viii.1883, 2–9.viii.1884, 31.vii.–8.viii.1885, 12–15.viii.1887 (*Stainton*); 6 ♂, 2 ♀, Norfolk, Merton, 28.vi.1885, 2.viii.1898 (*Walsingham*) (BMNH). **France**: 1 ♂, Paris (BMNH). **Germany (West)**: 2 ♂, Braunschweig, 1868 (*Heinemann*); 1 ♂, 1 ♀, no data (BMNH). **Poland**: 2 ♂, Szczecin ('Stettin'), 1879 (*Schulz*) (BMNH). **Austria**: 4 ♂, 1 ♀, Wien, viii (*Mann*); 1 ♀, Wien, Prater, vii.1858 (BMNH). **Italy**: 1 ♂ (*alsinella* paralectotype), [Friuli, Alpi Giulie], Cave del Predil ('Raibl') (*Zeller*) (BMNH). **Greece**: 1 ♀, Lakonia, Mt Taygetos, 1000 m, 8.viii.1979 (*Christensen*) (ZM). **U.S.A.**: 1 ♂, 2 ♀, Oregon, Eugene, 2, 15.vii., 3.viii.1972 (*Zimmerman*) (BMNH).

Caryocolum blandulella (Tutt, 1887)

(Figs 83, 84, 151, 212)

Gelechia (Lita) blandulella Tutt, 1887*b*: 105. LECTOTYPE ♀, GREAT BRITAIN: England (BMNH), here designated [examined].
Lita blandulella (Tutt); Rebel, 1901: 148; Benander, 1941: 42, fig. 2g.
Phthorimaea blandulella (Tutt) Meyrick, 1925: 95.
Gnorimoschema blandulellum (Tutt) Klimesch, 1954: 288, figs 20, 31.
Caryocolum blandulellum (Tutt) Gozmány, 1958: 201.
Caryocolum blandulella (Tutt); Bradley, Fletcher & Whalley, 1972: 23; Karsholt, 1981: 260, figs 5, 6, 19, 20, 27, 28.

ADULT (Figs 83, 84). ♂, 4·0–5·0 mm, ♀, 4·0–5·0(5·5) mm. Head whitish, occasionally mottled with mid-brown at vertex. Second segment of labial palpus white, mid-brown on outer surface; third segment blackish. Thorax and tegula white, sometimes speckled with mid-brown. Fore wing whitish, frequently mottled with greyish brown; broad black patch from fold to costa at one-quarter; black medial spot; comma-shaped subcostal spot distad of cell, sometimes extended towards tornus. White costal and tornal spots confluent, forming an indistinct fascia.

GENITALIA ♂ (Fig. 151). Transtilla with numerous spines. Valva short, slender, distal part slightly tapered. Sacculus broad, knife-shaped, reaching about same length as valva. Posterior margin of vinculum distinctly projected medially with broad V-shaped emargination. Saccus broad at base, gradually tapered. Anellus with pair of small pegs.

GENITALIA ♀ (Fig. 212). Eighth segment short, with pair of short digitate ventrolateral processes; ventromedial zone membranous; apophysis anterior about 3 times length of eighth segment; apophysis posterior 3 times length of anterior. Antrum ring-shaped, almost as long as eighth segment. Signum a short, stout hook.

REMARKS. The fore wing colour of *blandulella* varies from whitish to fuscous grey-brown. Dark coloured specimens are further characterized by the extended black markings, particularly from the cell to the tornus.

C. blandulella is easily confused with *blandelloides*, *blandella*, *proximum*, *alsinella* and *junctella*. It differs from the first two species by its smaller size, from *junctella* in the light head-colour. In genital characters *blandulella* is distinguished from the above-mentioned species by the shape of the valva, the membranous ventromedial zone and the processes of the eighth female segment and the shape of the antrum.

This species was described from an unspecified number of specimens collected on the Deal sandhills. I have examined 2 ♂, 6 ♀ syntypes and designate a female as lectotype.

BIOLOGY. Host-plant: *Cerastium pumilum* Curt. (Benander, 1965: 17).

According to Karsholt (1981: 260) the larva probably feeds also on *C. semidecandrum* L.

Larvae have been found in early June feeding in the seed-capsules (Benander, 1965: 17). Moths occur from mid-July to late August, particularly along sandy coasts.

DISTRIBUTION. Great Britain (England), Denmark, Sweden, France, West Germany, Yugoslavia, Greece.

Additional records. Netherlands (Klimesch, 1954: 288); Italy (Karsholt, 1981: 260).

Records from Finland are misidentifications of *petrophilum* (Krogerus & v. Schantz, 1970: 117).

MATERIAL EXAMINED (including 5 ♂, 9 ♀ genitalia preparations)

Lectotype ♀, **Great Britain**: England, Deal, Sandhills, 26.viii.1887 (*Tutt*) (BMNH).

Great Britain: 2 ♂, 5 ♀ (paralectotypes), England, Deal (*Tutt*) (BMNH). **Denmark**: 1 ♂, Sjaelland, Asserbo, 7.viii.1979 (*Robinson*) (BMNH); 1 ♂, 1 ♀, NWZ, Røsnaes, 27.vii.1978 (*Karsholt*); 2 ♂, WJ, Skallingen, 22–23.vii.1978 (*Karsholt*); 1 ♀, WJ, Blåvand, 23.vii.1978 (*Karsholt*) (ZM). **Sweden**: 1 ♂, 3 ♀, Öl, Seberneby, 21–23.vii.1975 (*Karsholt*); 1 ♂, 1 ♀, Öl, Boda, 18.vii.1975 (*Johansson*) (ZM). **France**: 1 ♀, Plouharnel (ZM). **Germany (West)**: 1 ♂, Ostfriesische Inseln, Wangerooge, 14.vii.1949 (*Jäckh*) (ZM); 1 ♂, Markt Steft (*Hofmann*) (BMNH). **Yugoslavia**: 1 ♂, 1 ♀, Croatia, Krk, Misucanyca, 6.viii.1975, 8.viii.1977 (*Jäckh*). **Greece**: 1 ♀, Lakonia, Mt Taygetos, 1000 m, 8.viii.1979 (*Christensen*) (ZM); 1 ♀, Olimbos, Litochoron, 1000 m, 16.viii.1973 (*Arenberger*) (coll. Arenberger, Wien).

Caryocolum tricolorella (Haworth, 1812)

(Figs 85, 152, 213)

Tinea tricolorella Haworth, 1812: 338. Syntypes, Great Britain: England [not traced].
Recurvaria contigua Haworth, 1828: 552. LECTOTYPE ♀, Great Britain: England (BMNH), here designated [examined].
Anacampsis contigua (Haworth) Stephens, 1835: 211.
Anacampsis tricolorella (Haworth) Stephens, 1835: 212.
Gelechia contigua (Haworth) Douglas, 1852*a*: 7, pl. 10, fig. 1.
Gelechia acernella Herrich-Schäffer, 1854: 185, pl. 77, fig. 580. Syntypes, Austria, Germany (West) [not traced].
Gelechia tricolorella (Haworth) Stainton, 1854: 123; 1867: 102, pl. 10, fig. 2.
Lita tricolorella (Haworth) Heinemann, 1870: 262; Benander, 1928: 78, pl. 6, fig. 38; 1941: 42, fig. 2b.
Lita tricorella (Haworth); Martini, 1916: 141. [Incorrect subsequent spelling of *tricolorella* Haworth.]
Phthorimaea tricolorella (Haworth) Meyrick, 1925: 96.
Gnorimoschema tricolorellum (Haworth) Klimesch, 1954: 287, figs 28, 29.
Caryocolum tricolorellum (Haworth) Gozmány, 1958: 205.

Adult (Fig. 85). ♂, ♀, 5·5–6·5 mm. Head dark grey-brown; frons white. Second segment of labial palpus whitish on inner surface, outer and ventral surface dark brown; third segment blackish mottled with white. Thorax and tegula mottled with brown, mesoscutellum lighter. Fore wing dark brown; basal third and dorsum whitish flecked with orange-brown, particularly dorsal margin; black spots near base and distad of cell, frequently lined with orange-brown; large black patch from fold to costa at one-third, merged with small distal spot. White costal and tornal spots separate.

Genitalia ♂ (Fig. 152). Transtilla with numerous minute spines. Valva long, distal part slightly broadened. Sacculus knife-shaped, indistinctly pointed. Posterior margin of vinculum medially weakly emarginated; pair of weakly developed medial projections. Saccus slender, gradually tapered. Anellus with pair of long needle-shaped sclerotizations.

Genitalia ♀ (Fig. 213). Eighth segment with two small flaps dorsally; ventral region with numerous microtrichia medially; apophysis anterior slightly shorter than eighth segment. Antrum short, funnel-shaped; comparatively narrow at base, about one-third breadth of eighth segment. Signum with large base and long, slender hook.

Remarks. *C. tricolorella* is usually easily recognized by the variegated, tricoloured fore wing pattern. It closely resembles *fibigerium* in genital characters but differs in the processes and emargination of the posterior margin of the vinculum, the shape of the valva and the short, comparatively narrow antrum.

T. tricolorella was described from an unspecified number of specimens. No syntypes were found in the BMNH collection. *Tinea tricolorella* Haworth, 1812, is not a junior homonym of *Phalaena Tinea tricolorella* (Gmelin, 1790).

R. contigua was described from an unspecified number of specimens and I designate the female syntype I have examined as lectotype.

Biology. Host-plants: *Stellaria holostea* L., *S. alsine* Grimm (Sorhagen, 1886: 194), ?*S. media* (L.) Vill. ('*Alsine media*') (Hering, 1937: 512), *Cerastium arvense* L. (Agassiz, *in litt.*).

The young larvae make gallery-like mines in the leaves, later feeding between spun terminal shoots before pupating from mid-April onwards (Stainton, 1867: 108). In Britain the mining larvae have been found in December and January. According to Sønderup (1949: 108), the larval mines occur as early as September. Moths have been collected from June to mid-September.

Distribution. Great Britain, France, West Germany, East Germany, Poland, Switzerland.

Additional records. Ireland (Klimesch, 1961: 655); Denmark, Norway, Sweden, Finland, Austria

(Klimesch, 1954: 287); Belgium (Lhomme, [1946]: 625); Netherlands (Snellen, 1882: 660); Czechoslovakia (Hrubý, 1964: 299); Hungary (Gozmány, 1958: 205); Rumania (Caradja, 1920: 101); Italy (Sicily) (Mariani, 1943: 169); U.S.S.R. (Piskunov, 1981: 686).

Material examined (including 5 ♂, 5 ♀ genitalia preparations)

Lectotype ♀ (*contigua*), **Great Britain** (BMNH).

Great Britain: 2 ♂, 5 ♀, England, Southampton, e.l. 1–20.vii.1935 (*Fassnidge*); 1 ♂, Southampton, Brockenhurst, New Forest, 5.viii.1930; 6 ♂, Norfolk, Merton, vii.–8.viii.1894 (*Walsingham*); 1 ♂, 2 ♀, Stogumber, viii.1945 (*Jacobs*); 1 ♀, Winchester, 9.viii.1935 (*Fassnidge*); 1 ♀, London, Lewisham, e.l. 16.vi.1871 (*Stainton*); 3 ♂ (BMNH). **France**: 1 ♀, Ariège, Auzat, 1.viii.–11.ix.1927 (*Fassnidge*); 1 ♀, Alpes-Maritimes, Peira-Cava, 4800 ft, 21.viii.1911 (*Walsingham*); 3 ♀, Paris (BMNH). **Germany (West)**: 1 ♀, Markt Steft, e.l. 23.vi.1868 (*Stellaria holostea*) (*Hofmann*); 3 ♂, Hannover; 3 ♂, 1 ♀, Frankfurt (Mühlig); 2 ♂, Württemberg (*Hartmann*) (BMNH); 1 ♀, Württemberg, Schwarzwald, Sprollenmühle, 560 m. e.l. 18.vi.1968 (*Stellaria holostea*) (*Süssner*); 1 ♂, Württemberg, Kirchberg/Murr, e.l. 24.vi.1963 (*Süssner*) (TLMF). **Germany (East)**: 4 ♂, 5 ♀, Jena (*Schläger*) (BMNH). **Poland**: 1 ♂, Swiebodzice ('Freiburg'), vi.1861 (*Wocke*) (BMNH). **Switzerland**: 2 ♂, 2 ♀, Zürich, e.l. 7.vi.1869 (BMNH). No locality data: 18 ♂, 16 ♀.

Caryocolum fibigerium sp. n.

(Figs 86, 153, 214)

Adult (Fig. 86). ♂, 4·5–5·5 mm, ♀, 4·0–5·5 mm. Head blackish, shiny; frons white. Second segment of labial palpus white mottled with mid-brown, dark brown on outer surface; third segment black. Thorax and tegula blackish, shiny, occasionally mid-brown distally. Fore wing blackish, mottled with dark brown; dorsal margin mid-brown, flecked with white; two irregular whitish brown fasciae from fold to costa at one-fifth and one-half; with numerous scattered orange-brown scales, particularly along fold and medially; white markings usually lined with orange-brown. White costal and tornal spots separate.

Genitalia ♂ (Fig. 153). Transtilla with numerous spines. Valva long, medially narrowing, distally slightly broader. Sacculus knife-shaped, indistinctly pointed. Posterior margin of vinculum with V-shaped emargination; medial and lateral pair of indistinct projections present. Saccus slender, evenly tapered. Anellus with pair of long needle-shaped sclerotizations.

Genitalia ♀ (Fig. 214). Eighth segment with pair of small flaps dorsally; ventral region with numerous microtrichia medially; apophysis anterior slightly longer than eighth segment. Antrum long; broad funnel-shaped, about half breadth of eighth segment. Signum with large base and long slender hook.

Remarks. *C. fibigerium* occasionally resembles dark specimens of *mucronatella*, but it always differs in the blackish shiny head and thorax and the extension of the orange-brown scales. It is easily distinguished from *mucronatella* by genital characters such as the posterior margin of the vinculum and the eighth female segment. *C. fibigerium* is similar to *tricolorella* in genital structures, but it differs from *tricolorella* in the emargination and projections of the posterior margin of the vinculum and the significantly larger antrum.

Biology. Host-plant unknown. Moths have been collected in late April at lower altitudes and from July to early October in mountainous areas up to 2800 m.

Distribution. Spain, Bulgaria, Greece, Morocco.

Material examined (including 12 ♂, 4 ♀ genitalia preparations)

Holotype ♀, **Spain**: Granada, Sierra Nevada, road to Veleta, 2000 m, 16.vii.1962 (*Sattler*) (BMNH).

Paratypes. **Spain**: 10 ♂, 7 ♀, Granada, Sierra Nevada, 2000–2300 m, 16–25.vii.1962, 17.vii.1969 (*Sattler; Sattler & Carter*) (BMNH); 16 ♂, 7 ♀, Granada, Sierra Nevada, Cam. del Veleta, 2000–2300 m, 24.vii., 22.ix.1983, 2, 19.viii.1984 (*Traugott-Olsen*) (coll. Traugott-Olsen, Marbella; ZM; coll. Huemer, Innsbruck); 1 ♂, Granada, Sierra Nevada, Ruta del Veleta, 1900 m, 24.viii.1984 (*Skou & Kavin*) (ZM); 4 ♂, Granada, Sierra de Alfacar, 1500 m, 12, 13.ix.1972 (*Sattler*) (BMNH); 1 ♂, 3 ♀, Malaga, El Chorro, 26.iv.1901 (*Walsingham*) (BMNH); 1 ♂, 1 ♀, Teruel, near Puerto de Orihuela, 1600 m, 28.viii.1984 (*Kavin & Skou*) (ZM). **Bulgaria**: 1 ♂, Samokov, 4.vii.1911 (BMNH). **Greece**: 4 ♂, Ioannina, Katara Pass, 1600 m, 11.viii.1985 (*Fibiger*); 1 ♂, Parnassos, ndl. Arakhova, 1900 m, 24.vii.1984 (*Arenberger*) (ZM); 2 ♂, Arkadhia, Mainalon Or. ('Menalo Gebirge'), sdl. Vitina, Elati, 1200 m, 3.viii.1985 (*Arenberger*) (coll. Arenberger, Wien). **Morocco**: 3 ♂, Haut Atlas, Oukaïmedene, 2400–2800 m, 5–21.vii.1972, 18.ix.–2.x.1973 (*Friedel*) (coll. Burmann, Innsbruck).

Caryocolum junctella (Douglas, 1851)

(Figs 87, 154, 162, 215)

Gelechia junctella Douglas, 1851: 103. LECTOTYPE ♂, GREAT BRITAIN: England (BMNH), here designated [examined].
[[no genus] *vicinella* Douglas; Herrich-Schäffer, 1855: 184, fig. 474. Misidentification.]
[[no genus] *marmorea* Haworth; Herrich-Schäffer, 1855: fig. 592. Misidentification.]
Lita junctella (Douglas) Heinemann, 1870: 264; Benander, 1928: 79, pl. 6, fig. 40; 1941: 42, fig. 3d.
Phthorimaea junctella (Douglas) Meyrick, 1925: 96.
Phthorimaea aganocarpa Meyrick, 1935: 585. Holotype ♂, JAPAN (BMNH) [examined]. **Syn. n.**
Gnorimoschema junctellum (Douglas) Klimesch, 1954: 286, figs 26, 27.
Phthorimaea aganocarpa Meyrick; Esaki et al., 1957: 45, pl. 7, fig. 200.
Gnorimoschema aganocarpa (Meyrick) Clarke, 1969: 143, pl. 71, figs 2, 2a, 2b.
Caryocolum junctellum (Douglas) Gozmány, 1958: 206.
Caryocolum iunctellum (Douglas); Hartig, 1964: 43. [Incorrect subsequent spelling of *junctella* Douglas.]
Caryocolum junctella (Douglas); Karsholt, 1981: 265, fig. 10.

ADULT (Fig. 87). ♂, ♀, 4·5–5·0 mm. Head metallic, dark greyish brown; frons silvery, shiny. Second segment of labial palpus whitish, mottled with dark brown on outer surface; third segment blackish. Thorax and tegula as head. Fore wing whitish mottled with greyish brown, particularly at base, across middle of wing and along dorsum; black patch from fold to costa at one-quarter; black stripe distad of cell extending towards tornus; large orange-brown patch distad of cell; some orange-brown scales in fold and along subcosta; dark brown apex. White costal and tornal spots usually confluent, forming a narrow fascia.

GENITALIA ♂ (Fig. 154). Transtilla with numerous spines. Valva slender, slightly broadened towards rounded apex, without bulge. Sacculus short, broader than valva, apex hook-shaped. Vinculum extremely short, posterior margin straight with a small incision. Saccus slender. Anellus with pair of semicircular sclerotizations.

GENITALIA ♀ (Fig. 215). Eighth segment short, pair of dorsal flaps present; ventral region with numerous minute microtrichia. Antrum long, tubular. Signum a very long, large hook with five short teeth basally.

REMARKS. *C. junctella* is usually recognized by the orange-brown patch distad of the cell; it resembles *blandulella*, *proximum* and *alsinella* in fore wing pattern but differs by the metallic shiny head and the pale frons. It differs from other *Caryocolum* in genital characters such as the hook-shaped sacculus, the narrow valva and the unique shape of the signum.

G. junctella was described from an unspecified number of specimens collected by Bouchard on trunks of oaks. I have examined 3 ♂ syntypes, one of which is here designated lectotype.

P. aganocarpa was described from a single specimen, erroneously recorded as a female. According to the original description, this specimen was collected by T. Esaki, although it is labelled SI [S. Issiki].

BIOLOGY. Host-plants: *Cerastium arvense* L. (Benander, 1928: 79); *C. pauciflorum* Steven ex Ser. (Liu & Pai, 1979: 276) [China]; *Stellaria media* (L.) Vill. (coll. Burmann).

According to Klimesch (1954: 286) the larva was also found on a 'bog' *Stellaria* species.

Records of *Salix* as a host-plant (e.g. Sorhagen, 1886: 195; Lhomme, [1946]: 627) are a misinterpretation of Threlfall (1879: 273) who beat the moth from willow in late April.

The larvae have been found in May (Benander, 1928: 79). *C. junctella* seems to be the only *Caryocolum* species hibernating as an adult. Moths have been collected in April, May and July, August.

DISTRIBUTION. Great Britain, West Germany, East Germany, Poland, Switzerland, Austria, Czechoslovakia, Japan.

Additional records. Portugal (Vives Moreno, 1985: 13); Spain (Agenjo, 1968: [6]); France (Lhomme, [1946]: 184); Denmark, Sweden (Karsholt, 1981: 265); Finland (Jalava, 1977: 15); Belgium (de Prins, 1983: 14); Netherlands (Lempke, 1976: 26); Italy (Mariani, 1943: 169); Norway, Hungary (Klimesch, 1954: 286); Yugoslavia (Rebel, 1904: 351); Bulgaria (Klimesch, 1968: 125); Rumania (Caradja, 1920: 101); U.S.S.R. (European part) (Piskunov, 1981: 686); China (Liu & Pai, 1979: 276).

MATERIAL EXAMINED (including 4 ♂, 3 ♀ genitalia preparations)

Lectotype ♂ (*junctella*), **Great Britain**: England, [viii (*Bouchard*)] (BMNH). Holotype ♂ (*aganocarpa*), **Japan**: Hukuoka, Kyusyu, v.1934 (BMNH).

Great Britain: 2 ♂ (*junctella* paralectotypes), England; 1 ♂, Kent, nr Sandwich, 8–10.vii.1977 (*Tuck*) (BMNH); 2 ♂, 1 ♀, Scotland, Perthshire, Forres (*Salvage*) (BMNH). **Germany (West)**: 1 ♀, München,

1871; 1 ♂, Regensburg, 1865 (*Hofmann*); 1 ♂, Frankfurt, 1843; 1 ♂, 14.v.1854 (*Hofmann*) (BMNH). **Germany (East)**: 1 ♀, Dresden (*Tischer*); 2 ♂, Niesky, 17.viii.1856 (*Christoph*) (BMNH). **Poland**: 14 ♂, 2 ♀, Silesia (*Staudinger*) (BMNH). **Austria**: 1 ♂, Tirol, Natters, 800 m, 2.viii.1953 (*Burmann*); 1 ♂, Tirol, Lans, 800 m, e.o. vii.1969 (*Stellaria media*) (*Burmann*) (coll. Burmann, Innsbruck); 1 ♂, Tirol, Sistranser Wiese, 1000 m, 24.viii.1958 (*Hernegger*) (TLMF); 1 ♀, Wien, v (BMNH). **Switzerland**: 1 ♂, Thusis, 21.viii.1880 (*McLachlan*) (BMNH). **Czechoslovakia**: 1 ♀, Praha, 17.viii.1861 (*Hofmann*) (BMNH).

Caryocolum kasyi sp. n.

(Figs 88, 155)

Adult (Fig. 88). ♂, 6·0 mm. Head whitish, vertex greyish brown. Second segment of labial palpus white mottled with dark brown on outer surface; third segment blackish. Thorax and tegula greyish brown, distal part whitish. Fore wing greyish brown, scales greyish at base and predominantly dark brown apically; greyish white markings: indistinct fasciae from fold to costa at one-fifth and one-half; costa and dorsum lightened with greyish white; large dark brown discal patch at one-third. White costal and tornal spots confluent, forming a distinct apical fascia.

Genitalia ♂ (Fig. 155). Transtilla with numerous spines. Valva broad at base; abruptly tapered to long digitate distal part. Sacculus about same length as valva, broad, knife-shaped. Vinculum very broad and short; posterior margin of vinculum considerably projected with medial incision. Saccus broad at base, strongly tapered to slender distal part. Aedeagus short.

Genitalia ♀, Unknown.

Remarks. *C. kasyi* is easily recognized by the characteristic shape of the valva, sacculus and vinculum. The wings of the holotype are unfortunately rather greasy and therefore the markings are difficult to recognize. *C. kasyi* could belong to a separate species-group but further material, particularly females, is required to resolve this question.

Biology. Host-plant unknown. The holotype was collected between late June and early July.

Distribution. Afghanistan.

Material examined (including 1 ♂ genitalia preparation)
Holotype ♂, **Afghanistan**: Paghman, 30 km NW. of Kabul, 2200 m, 29.vi.–8.vii.1963 (*Kasy & Vartian*) (genitalia slide no. 13453; NM).

The *extremum*-group

Characters as described under *extremum*.

Caryocolum extremum sp. n.

(Figs 89, 156, 216)

Adult (Fig. 89). ♂, ♀, 5·5 mm. Head dark grey-brown. Second segment of labial palpus whitish on inner surface, dark brown on outer surface; third segment blackish mottled with white. Thorax and tegula grey-brown. Fore wing with costal part dark brown; dorsal part mid-brown mottled with a few white scales; two indistinct, likewise coloured patches across fold, lined with black costad; orange-brown scales in fold and distad of cell. Light costal and tornal spots confluent, forming an indistinct, narrow, angled fascia. Hind wing dark brown.

Genitalia ♂ (Fig. 156). Uncus long, narrow, smooth, with transverse sclerite dorsally. Tegumen anteriorly very broad, medially strongly narrowing; pedunculi large. Transtilla with numerous spines. Valva broad, sea-horse-shaped. Sacculus stick-shaped, short. Vinculum very broad, short; posterior margin extremely projected with medial incision. Saccus stout, evenly tapered towards apex. Aedeagus without cornuti, strongly sclerotized apical arm developed.

Genitalia ♀ (Fig. 216). Eighth segment almost square-shaped with pair of small lateral flaps; ventral zone with numerous microtrichia. Antrum broad, funnel-shaped. Ring-shaped spiny sclerotization surrounding entrance of ductus seminalis. Signum broad at base, stout hook with indistinct additional teeth.

Remarks. *C. extremum* is the only *Caryocolum* species with a circular, spiny sclerotization in the ductus bursae. The males are easily recognized by the extremely projected vinculum and the shape of the valva and sacculus. Occasionally *extremum* somewhat resembles *marmoreum* externally, but in addition to the

genitalia, *extremum* is easily distinguished by the dark brown hind wing. *C. extremum* is here treated in a separate species-group because of the unique genitalia which exhibit highly apomorphic characters such as the shape of the vinculum in the male and the spiny ring in the female.

Biology. Host-plant unknown. Moths have been collected from late May to mid-July. This species occurs in primary montane oak forests at about 2700 m.

Distribution. Nepal.

Material examined (including 1 ♂, 2 ♀ genitalia preparations)

Holotype ♀, **Nepal**: Kathmandu Distr., Phulchoki, 8800′, 27–31.v.1983 (primary montane oak forest) (*Allen, Brendell, Robinson, Tuck*) (genitalia slide no. 24281; BMNH).

Paratypes. **Nepal**: 1 ♂, 1 ♀, same data as holotype; 2 ♀, Phulchoki Peak, 2760 m, 11.viii.1983 (montane & oak forest) (*Allen*) (BMNH).

The *cassella*-group

Characters as described under *cassella*.

Caryocolum cassella (Walker, 1864)

(Figs 90, 157, 217)

Gelechia cassella Walker, 1864: 594. Holotype ♂, North America (BMNH) [examined].
Gelechia (Lita) melanotephrella Erschoff, 1877: 345. Holotype ♀, U.S.S.R. (Irkutsk) (ZI) [examined]. **Syn. n.**
Lita melanotephrella (Erschoff) Rebel, 1901: 149.
[*Lita vicinella* (Douglas); Petry, 1912: 115. Misidentification.]
Phthorimaea melanotephrella (Erschoff) Meyrick, 1925: 96.
Lita albifasciella Toll, 1936: 407, pl. 49, fig. 20. Syntypes, U.S.S.R.: Podolien, Jamy (Kreis Grudziadz), 23.vii., Wolzkow (Kreis Zaleszczyki), 23.vii. [not traced]. **Syn. n.**
[*Aristotelia rubidella* (Clemens); Gaede, 1937: 76 (partim). Misidentification.]
Phthorimaea subvicinella Hackman, 1946: 63, figs 9, 10. Lectotype ♀, Finland: N. Helsinge, 16.viii.1933 (*Nybom*) (genitalia slide no. 2599 OK; Zool. Mus. Helsinki), designated by Karsholt (1981: 267) [not examined]. [Synonymized with *albifasciella* by Klimesch, 1954: 336.] **Syn. n.**
Gnorimoschema albifasciellum (Toll) Klimesch, 1954: 336, figs 32, 33.
Caryocolum albifasciellum (Toll) Gozmány, 1958: 202; Jensen, 1971: 13, fig.
Caryocolum subvicinellum (Hackman) Hartig, 1964: 44.
Caryocolum falellum Piskunov, [1975]: 869, fig. 17. Holotype ♀, U.S.S.R.: Byelorussia: Podberez'ye, 6 km N. of Vitebsk. 5.viii.1971 (*Piskunov*) (ZI) [not examined]. [Synonymized with *albifasciella* by Karsholt, 1981: 267.] **Syn. n.**
[?*Caryocolum* pr. *huebneri* (Haworth); Povolný, 1977*a*: 225, figs 13, 22. Probably misidentification.]
Caryocolum cassellum (Walker) Povolný, 1980: 197.
Caryocolum cassella (Walker); Hodges, 1983: 22.

Adult (Fig. 90). ♂, 5·5–6·5 mm, ♀, 5·5–6·0 mm. Head light to dark grey; frons whitish and silvery, occasionally ochre. Second segment of labial palpus cream, mottled with dark brown on outer surface; third segment blackish. Thorax dark brown, tegula light brown. Abdomen with whitish sternal region. Fore wing light to dark brown mottled with orange-brown. Dorsal margin greyish white, two indistinct greyish white fasciae from fold to costa at one-fifth and one-half. Black markings: spot near base, discal patch, streak distad of cell. White costal and tornal spots separate.

Genitalia ♂ (Fig. 157). Transtilla elliptical, strongly sclerotized, without spines. Valva broad, short, triangular, with indistinct apical brush of setae. Sacculus short, slender, triangular. Vinculum large; posterior margin slightly incised medially; indistinct lateral projection. Saccus very broad at base, tapered towards apex. Aedeagus without cornuti.

Genitalia ♀ (Fig. 217). Eighth segment with pair of rod-like ventrolateral sclerotizations and additional pair of drop-shaped processes; ventromedial zone a large ovate sclerotization with numerous microtrichia. Antrum short, deep emargination posteriorly. Ductus bursae with two short lateral sclerites posteriorly. Signum with broad base and distinct hook.

Remarks. Externally *C. cassella* closely resembles *pullatella* and darkened specimens of *klosi*. It differs in

the white sternal region of the abdomen and genital characters such as the shape of the valva and sacculus, the elliptical transtilla and the drop-shaped processes of the eighth female segment.

G. cassella was erronously described as a female from a single specimen collected in North America. However, the holotype, which is now preserved in the BMNH, is a male.

G. melanotephrella was described from a single female collected at the end of June near Irkutsk. I have examined the holotype.

L. albifasciella was described from two female syntypes. No type-material has been found in the Toll collection in Kraków (Razowski, *in litt.*).

Gaede (1937: 76) erroneously placed *cassella* as a junior synonym of *Aristotelia rubidella* Clemens.

Biology. Host-plant: *Stellaria nemorum* L. (Petry, 1912: 117).

The larvae feed during May and June between spun shoots, particularly in shadowy woodland. Moths emerge in June and July; in the wild they have been caught until late August.

Distribution. Holarctic: France, Denmark, Norway, Sweden, West Germany, Poland, Austria, U.S.S.R., Canada, U.S.A.

Additional records, Finland (Jalava, 1977: 15); Switzerland (Klimesch, 1934: 336). A record from Japan (Hokkaido) as *Caryocolum* close to *huebneri* (Povolný 1977*a*: 225) almost certainly belongs to *cassella*.

Material examined (including 14 ♂, 13 ♀ genitalia preparations)

Holotype ♂ (*cassella*), **North America** (genitalia slide no. 9204; BMNH). Holotype ♀ (*melanotephrella*), **U.S.S.R.**: Irkutsk, 30.vi.1869 (genitalia slide no. 15651; ZI).

France: 1 ♂ (BMNH). **Denmark**: 1 ♀, Dujene, 3.viii.1965 (*Pedersen*); 1 ♂, Boto, 22.vii.1967 (*Pedersen*); 1 ♂, Monsklint, 4.viii.1965 (*Pedersen*) (ZM). **Norway**: 1 ♂, IV. Evenes Gulli, e.l. 29.vi.1953 (*v. Schantz*); 1 ♀, Nnø, Rombakn, 2.viii.1985 (*Svensson*) (coll. Svensson, Österslöv); 1 ♀ Eis 45, Os Gjøvik, Rambekk, 5.viii.1982 (*Aarvik*); 1 ♂, Eis 28, Ak Ås, Arungen, e.l. 12.vii.1982 (larva 9.vi. on *Stellaria nemorum*) (*Aarvik*) (BMNH). **Sweden**: 1 ♂, Fjälkestad, Ebbetorp, 25.vii.1956 (*Svensson*) (BMNH). **Germany (West)**: 2 ♂, 1 ♀, Württemberg, Schwarzwald, Sprollenhaus, e.l. 23.vi.1960, e.l. 20–30.vi.1963 (*Süssner*); 1 ♂, Schwarzwald, Wildbad, 550 m, e.l. 4.vi.1971 (*Süssner*) (TLMF). **Poland**: 1 ♂, Wroclaw ('Breslau') (ZM); 1 }, [10 mi W. of Klodzka,] Reinerz, 4.viii.1858 (*Wocke*) (BMNH). **Austria**: 1 ♂, Tirol, Herztal-Ampass, e.l. 6.vi.1972 (*Hernegger*); 1 ♂, Tirol, Unterberg, 800 m, 12.vii.1958 (*Hernegger*) (TLMF); 3 ♀, Innsbruck, e.l. vii.1965, 1.viii.1969 (*Burmann*); 1 ♂, Tirol, Lauterbach, 23.viii.1942 (*Burmann*) (coll. Burmann, Innsbruck). **U.S.S.R.** (European part): 1 ♂, Vitebsk, 30.vi.1986 (*Piskunov*) (ZI). **Canada**: 1 ♀, [British Columbia,] Vancouver Island, Esquimalt (*Walker*) (BMNH); 1 ♀, Vancouver Island, Quamichan Lake, 3.vii.1924 (NMNH). **U.S.A.**: 2 ♂, 1 ♀, Utah, Sanpete Co, Ephraim Can, Major's Flat, 7100′, 3.viii.1981 (*Hodges*); 1 ♀, same data, Willow Cr. Trail, 7000′, 31.vii.1981 (*Hodges*); 4 ♂, 1 ♀, same data, Grt Basin Expt Sta, 8850′, 22.vii.–6.viii.1981 (*Hodges*); 1 ♀, same data, Mouth Ephrain Can, 5300′, 27.vii.1981 (*Hodges*); 3 ♂, 5 ♀, Oregon, Baker Co, 4.vii.1955, 20.vii.–24.viii.1962 (*Clarke; Baker*); 1 ♂, Michigan, Isle Royale, 24.vii.1957 (*Hodges*); 1 ♀, Kentucky, Letcher Co, Big Black Mt., e.l. 2.vi.1935 (*Braun*) (NMNH).

The *huebneri*-group

Genitalia ♂. Uncus long, narrow, smooth. Tegumen very broad anteriorly with deep emargination, strongly narrowing medially; pedunculi large; tegumen with short to long lateral processes. Transtilla with a few to numerous spines. Valva short with apical setae. Sacculus short, broad. Posterior margin of vinculum broadly emarginated. Saccus extremely broad. Aedeagus without cornuti.

Genitalia ♀. Eighth segment with flap-shaped ventral processes; ventromedial area membranous. Antrum funnel-shaped. Signum a typical hook or reduced to a plate.

Biology. Host-plants: Alsinoideae (*Stellaria, Cerastium, Moehringia*).

Caryocolum moehringiae (Klimesch, 1954)

(Figs 91, 158, 218)

Gnorimoschema moehringiae Klimesch, 1954: 338, figs 36, 37, 38. LECTOTYPE ♂, Austria (coll. Klimesch, Linz), here designated [examined].

Caryocolum moehringiae (Klimesch) Gozmány, 1958: 202; Hartig, 1964: 44; Sauter, 1983: 116.

Adult (Fig. 91). ♂, ♀, 5·5–6·0 mm. Head: scales whitish with dark brown distal part; frons whitish. Second segment of labial palpus white, mottled with dark brown on outer surface; third segment dark brown, flecked white on dorsal surface. Thorax and tegula mottled with white and dark brown. Fore wing

whitish mottled with grey-brown; scattered orange-brown scales; indistinct dark basal spot; black patch from fold to costa at one-quarter, frequently interrupted by orange-brown streak; black comma- shaped streak distad of cell, extending towards tornus; irregular orange-brown patch distad of cell. White costal and tornal spots separate or confluent, forming a fascia.

GENITALIA ♂ (Fig. 158). Uncus long, narrow, smooth. Transtilla with numerous spines. Valva digitate, short. Sacculus digitate, shorter than valva. Posterior margin of vinculum slightly incised medially, lateromedial part projected; pliers-shaped lateral process developed, almost reaching apex of valva. Saccus broad at base, evenly tapered. Aedeagus without cornuti.

GENITALIA ♀ (Fig. 218). Eighth segment with pair of flap-like ventrolateral processes; medial zone with numerous microtrichia. Antrum short, funnel-shaped, reaching about same length as eighth female segment. Posterior part of ductus bursae with pair of small sclerites. Signum a spiny disk without hook.

REMARKS. Externally *C. moehringiae* is similar to *huebneri*, *kroesmanniella*, *blandelloides*, *proximum* and particularly *petrophilum*. It differs from *huebneri* and *kroesmanniella* in the less variegated fore wing pattern and from *blandelloides* in the more numerous fuscous scales and indistinct black markings. *C. moehringiae* is sometimes distinguished from *petrophilum* by the broken fascia at four-fifths and the black streak distad of the cell which extends to the tornus. It is also characterised by unique genital structures such as the pliers-shaped process of the vinculum and the shape of the signum.

G. moehringiae was described from 22 ♂, 35 ♀ collected in Austria. A male was labelled as holotype by Klimesch but no formal holotype designation was made in the original description; this specimen is here designated lectotype.

BIOLOGY. Host-plant: *Moehringia muscosa* L., *M. bavarica* (L.) Gren (Klimesch, 1954: 341).

Specimens bred ex *Cerastium* (coll. Burmann) are probably mislabelled.

The larvae occur in April and May, usually in coniferous woodland. In the early stages they are leaf-miners, later feeding between spun terminal shoots (Klimesch, 1954: 341). Moths were bred from early June to mid-July; a single adult was collected at the end of August in the wild.

DISTRIBUTION. Austria.

Additional records. West Germany (Pröse, pers. comm.); Switzerland (Sauter, 1983: 116).

MATERIAL EXAMINED (including 4 ♂, 2 ♀ genitalia preparations)

Lectotype ♂, **Austria**: Ober-Österreich ('Austria sup.'), Aschachtal, Zöherleiten, e.l. 19.vi.1941 (larva 1.v. on *Moehringia muscosa*) (*Klimesch*) (genitalia slide no. 418 Klimesch; coll. Klimesch, Linz).

Austria: 2 ♂, 2 ♀, Tirol, Umhausen, e.l. 18.vii.1944 (?*Cerastium arvense*), e.l. 24.vii.1945 (?*Cerastium*), e.l. 9.vi.1947 (*Moehringia muscosa*) (*Burmann*) (coll. Burmann, Innsbruck); 1 ♂, 1 ♀ (paratypes), Steiermark, Peggau, Peggauer Wand, e.l. vi.1949 (*Moehringia malyi*) (*Klimesch*) (coll. Klimesch, Linz; BMNH); 1 ♀ (paratype), Ober-Österreich, Neufelden, Tal d. Gr. Mühl, e.l. 18.vi.1952 (*Moehringia muscosa*) (*Klimesch*) (BMNH); 1 ♂, Trattenbach, 27.viii.1913 (*Mitterberger*) (coll. Klimesch, Linz).

Caryocolum petrophilum (Preissecker, 1914)

(Figs 92, 159, 219)

Gelechia (Lita) petrophila Preissecker, 1914: 18, fig. LECTOTYPE ♀, AUSTRIA: Nieder-Österreich (NM), here designated [examined].

Phthorimaea petrophila (Preissecker) Gaede, 1937: 280.

Phthorimaea kemnerella Palm, 1947: 39. figs 1c, 1f. Holotype ♀, SWEDEN: Norrbotten (Nordanskar), 1.viii.1946 [not traced]. [Synonymized by Krogerus & v. Schantz, 1970: 118.]

Lita petrophilia (Preissecker); Skala, 1950: 115. [Incorrect subsequent spelling of *petrophila* Preissecker.]

Gnorimoschema petrophilon (Preissecker) Klimesch, 1954: 337, figs 34, 35. [Unjustified emendation of petrophila Preissecker.]

Caryocolum petrophilon (Preissecker) Gozmány, 1958: 202. [Unjustified emendation of *petrophila* Preissecker.]

Caryocolum petrophilum (Preissecker); Hartig, 1964: 44 (partim).

ADULT (Fig. 92). ♂, 5·0–6·0 mm, ♀, 5·0 mm. Head: scales whitish, with dark brown distal part; frons whitish. Second segment of labial palpus whitish, dark brown on outer surface; third segment dark brown, flecked whitish dorsally. Thorax and tegula mottled with white and dark brown. Fore wing whitish mottled with grey brown, scattered orange-brown scales; black markings: indistinct dark basal spot; black patch from fold to costa at one-quarter, usually interrupted by orange-brown streak; small black discal spot;

black comma-shaped streak distad of cell, rarely extended towards tornus; orange-brown patch distad of cell. White apical fascia present.

GENITALIA ♂ (Fig. 159). Tegumen with short lateral process; transtilla with numerous spines. Valva short digitate, slender. Sacculus triangular, broader than valva. Posterior margin of vinculum with V-shaped emargination; large lateromedial projection triangular. Saccus very broad, distal part rounded.

GENITALIA ♀ (Fig. 219). Eighth segment short, with pair of flap-like ventrolateral processes. Antrum longer than eighth segment, funnel-shaped, with a few microtrichia. Signum a long slender hook.

REMARKS. *C. petrophilum* bears a superficial resemblance to *huebneri*, *kroesmanniella*, *blandelloides*, *proximum* and particularly *moehringiae*. It differs from *huebneri* and *kroesmanniella* in the less variegated fore wing markings which, however, are more variegated than in *blandelloides* and *proximum*. *C. petrophilum* occasionally differs from *moehringiae* in the white costal and tornal spots at four-fifths which are confluent and form a fascia, and the black streak distad of the cell which is rarely extended towards the tornus. It is distinguished from all the species mentioned by the shape of the saccus and vinculum, the short eighth female segment, the shape of the antrum and the signum.

G. petrophila was described from an unspecified number of specimens collected in Austria. I have examined a female syntype which is here designated as lectotype.

P. kemnerella was described from a single female collected in north Sweden (Nordanskar). The holotype has been examined by Krogerus & v. Schantz who synonymized it with *petrophilum*.

BIOLOGY. Host-plant: *Cerastium* L. (Klimesch, 1954: 337).

According to Skala (1950: 115) the young larvae are leaf-miners. Moths have been collected from June to mid-September.

DISTRIBUTION. Finland, Austria, Italy.

Additional records. Sweden (Krogerus & v. Schantz, 1970: 118); Sicily (Klimesch, 1954: 337).

MATERIAL EXAMINED (including 4 ♂, 1 ♀ genitalia preparations)

Lectotype ♀, **Austria**: [Nieder-Österreich,] Spitz a[n der] D[onau], Buchberg, 4.vii.[19]01 (*Preissecker*) (NM).

Finland: 1 ♂, EH. Lahti, 31.vii.1968 (*Lankinen*) (BMNH). **Austria**: 1 ♂, Nieder-Österreich, Spitz/Donau, 18.vi.1917; 2 ♂, 1 ♀, Nieder-Österreich, Dürnstein, e.l. 5–13.vi.1955 (*Cerastium*) (*Klimesch*) (coll. Klimesch, Linz; BMNH). **Italy**: 1 ♂, Südtirol, Schnalstal, 800 m, A. viii.1969 (*Zürnbauer*) (TLMF); 1 ♂, 1 ♀, Südtirol, Laatsch, 1000 m, 15.ix.1980 (*Burmann*) (coll. Burmann, Innsbruck).

Caryocolum huebneri (Haworth, 1828)

(Figs 93, 160, 220)

Recurvaria huebneri Haworth, 1828: 551. Lectotype ♂ [abdomen missing], GREAT BRITAIN: England (BMNH), designated by Ridout (1977: 38) [examined].
[*Tinea granella* Linnaeus; Hübner, 1796: pl. 24, fig. 165. Misidentification.]
Gelechia hubnerella Doubleday, 1859: 30. [Unjustified emendation of *huebneri* Haworth.]
Gelechia knaggsiella Stainton, 1866: 167. Lectotype ♂ [abdomen missing], GREAT BRITAIN: England (BMNH), designated by Ridout (1977: 38) [examined]. [Synonymized by Ridout, 1977: 38.]
Lita knaggsiella (Stainton) Heinemann, 1870: 262; Benander, 1928: 78, pl. 6, fig. 35; 1941: 42. fig. 2d.
Phthorimaea knaggsiella (Stainton) Meyrick, 1925: 95.
Gnorimoschema knaggsiellum (Stainton) Klimesch, 1954: 358, figs 41, 42.
Caryocolum knaggsiellum (Stainton) Gozmány, 1958: 204.
Caryocolum huebneri (Haworth) Ridout, 1977: 38.

ADULT (Fig. 93). ♂, 5·0–5·5 mm, ♀, 5·0–6·0 mm. Head mid- to dark brown, mottled with white; frons white. Labial palpus with second segment white, flecked dark brown; third segment blackish. Thorax and tegula as head. Fore wing whitish densely mottled with mid-brown, light brown and orange-brown; apex dark brown. Black markings: broken fascia from fold to costa at one-quarter; spots costad of cell at one-half and three-fifths. White costal and tornal spots usually separate.

GENITALIA ♂ (Fig. 160). Tegumen with long lateral process; transtilla weakly sclerotized with few minute spines. Valva short, thumb-shaped, slightly pointed. Sacculus slender, short. Posterior margin of vinculum with V-shaped emargination; large, rounded lateral projections. Saccus extremely broad, distal part rounded. Aedeagus with strongly sclerotized apical arms.

GENITALIA ♀ (Fig. 220). Eighth segment with pair of flap-like ventrolateral processes; ventral zone membranous. Antrum a moderately short tube. Signum a short, slightly bent hook.

REMARKS. Externally *C. huebneri* resembles *kroesmanniella*, *petrophilum*, *moehringiae* and *blandelloides*. It differs from *kroesmanniella* in the smaller size and the mottling of the thorax and fore wings, from the other species mentioned in the more variegated fore wing markings. It is easily distinguished from other *Caryocolum* in genital characters such as the shape of the saccus, the posterior margin of the vinculum, the eighth female segment and the antrum.

C. huebneri was known as *C. knaggsiella* until Ridout (1977) clarified its identity.

BIOLOGY. Host-plant: *Stellaria holostea* L. (Bradford, [1979]: 129).

The larva occurs in May, feeding between spun shoots. Moths have been collected from mid-July to late August (Stainton, 1866: 168). Bred material dates from mid-June to late July.

DISTRIBUTION. Great Britain, West Germany, Poland, Czechoslovakia, Hungary.

Additional records. France, Belgium (Lhomme, [1946]: 623); Sweden (Hackman *et al.*, 1950: 19); East Germany (Rapp, 1936: 113); Switzerland, Austria (Klimesch, 1954: 358); Italy (Mariani, 1943: 169); U.S.S.R. (European part) (Piskunov, 1981: 686).

MATERIAL EXAMINED (including 4 ♂, 3 ♀ genitalia preparations)

Lectotype ♂ (*huebneri*), [**Great Britain**: England] [abdomen missing] (*Haworth*) (BMNH). Lectotype ♂ (*knaggsiella*), [**Great Britain**: England, Surrey, Haslemere,] 1865 [abdomen missing] (*Barrett*).

Great Britain: 1 ♀ (*knaggsiella* paralectotype), England, [Surrey,] Haslemere (*Barrett*) (BMNH). **Germany (West)**: 3 ♂, 3 ♀, Braunschweig, e.l. 27.vi.–10.vii.1868 (*Stellaria holostea*); 1 ♂, 1 ♀, Hannover, e.l. 6.vii.; 2 ♂, 1 ♀, Altenburg (*Staudinger*); 1 ♀, Markt Steft, 1873 (*Hofmann*) (BMNH). **Poland**: 1 ♂, 1 ♀, Leszno ('Lissa'), 27.vii.1888; 1 ♂, Silesia, 1892 (*Staudinger*) (BMNH). **Czechoslovakia**: 1 ♂, Praha (BMNH). **Hungary**: 3 ♂, Czerkut p. Pecs, 12–20.vi.1936 (*Klimesch*) (coll. Klimesch, Linz). No locality data: 8 ♂, 7 ♀.

Caryocolum kroesmanniella (Herrich-Schäffer, 1854)

(Figs 94, 161, 221)

Gelechia kroesmanniella Herrich-Schäffer, 1854: 166, pl. 77, fig. 581. Type(s), GERMANY (WEST): Hannover (*Krösmann*) [not traced].

[*Gelechia huebneri* (Haworth); Douglas, 1850: 63 (partim); Stainton, 1854: 125. Misidentifications.]

[*Lita huebneri* (Haworth); Heinemann, 1870: 261; Benander, 1928: 77, pl. 6, fig. 34; 1941: 41, fig. 2a. Misidentifications.]

[*Phthorimaea huebneri* (Haworth); Meyrick, 1925: 95. Misidentification.]

[*Gelechia hybneri* (Haworth); Rapp, 1936: 113. Incorrect subsequent spelling of *huebneri* Haworth. Misidentification.]

[*Gnorimoschema huebneri* (Haworth); Klimesch, 1954: 358, figs 39, 40. Misidentification.]

[*Caryocolum huebneri* (Haworth); Gozmány, 1958: 202. Misidentification.]

Caryocolum kroesmanniella (Herrich-Schäffer); Ridout, 1977: 39.

ADULT (Fig. 94). ♂, 5·5–6·5 mm, ♀, 6·0–7·0 mm. Head grey-brown mottled with whitish; frons white. Second segment of labial palpus whitish speckled with light to mid-brown; third segment dark brown. Thorax and tegula whitish, flecked with orange-brown and mid-brown. Fore wing whitish mottled with light brown and orange-brown. Black markings: broken fascia from fold to costa at one-quarter; spots costad of cell at one-half and three-fifths, latter extending to dark brown tornus. White costal and tornal spots confluent, forming an indistinct, angled fascia.

GENITALIA ♂ (Fig. 161). Tegumen with long lateral process; transtilla weakly sclerotized, spines almost completely absent. Valva and sacculus slender. Posterior margin of vinculum with extremely broad rectangular emargination; pair of large lateral triangular processes. Saccus extremely broad; almost rectangular. Aedeagus with comparatively weakly sclerotized apical arms.

GENITALIA ♀ (Fig. 221). Eighth segment with pair of drop-shaped dorsal processes; ventral zone membranous. Antrum very long, funnel-shaped; anterior margin slightly incised; medial part with some microtrichia. Signum a small plate without hook.

REMARKS. *C. kroesmanniella* is unusually variable in the composition of the fore wing colour. It closely resembles *huebneri* externally but may be distinguished by its larger size and the usually paler colour of the thorax and fore wing. *C. kroesmanniella* differs from the externally similar *blandelloides* and *blandella* in

the pale ground colour and the broken black fascia at one-quarter. The male genitalia differ from those of all other *Caryocolum* species in the shape of the posterior margin of the vinculum and the extremely broad saccus. The female genitalia are characterized by the dorsal processes of the eighth segment, the long antrum and the shape of the signum.

G. kroesmanniella was described from an unspecified number of specimens collected near Hannover by Krösmann. The type(s) have not been found.

This species has often been misidentified as *huebneri* (Ridout, 1977).

Biology. Host-plants: *Stellaria holostea* L., *S. alsine* Grimm (= *S. uliginosa* Murray) (Klimesch, 1954: 358); *S. media* (L.) Vill. (Süssner, 1966: 100).

Adults have been collected in the vicinity of *S. graminea* L. which may be a further host-plant (Pröse, 1979: 67). One specimen was bred from *S. nemorum* L. by Süssner, a record which needs confirmation.

The young larva lives in a leaf-mine during the autumn but after hibernation it feeds between spun leaves until May (Hering, 1937: 512; Benander, 1965: 17). In northern Europe larvae have been found until the end of June. Moths have been collected in open woodland from early July to early September.

Distribution. Great Britain, West Germany, East Germany, Czechoslovakia, Hungary.

Additional records. France, Belgium (Lhomme, [1946]: 623); Netherlands (Snellen, 1882: 658); Denmark, Sweden, Finland, Austria (Klimesch, 1954: 358); Poland (Schille, 1931: 182); U.S.S.R. (European part) (Piskunov, 1981: 686).

A record from Japan as *Caryocolum* close to *huebneri* (Povolný, 1977*a*: 225) refers to *cassella*.

Material examined (including 3 ♂, 4 ♀ genitalia preparations)

Great Britain: 1 ♀, England, Jamworth; 2 ♂, 2 ♀, Staffordshire, 1887 (*Mason*); 1 ♂, Buxton, 1870; 1 ♀, no data (BMNH). **Germany (West)**: 1 ♂, Württemberg, Bissingen/Enz, e.l. 12.vi.1969 (*Stellaria nemorum*) (*Süssner*); 1 ♀, Württemberg, Schwarzwald, Sprollenmühle, 560 m, e.l. 8.vi.1968 (*Stellaria holostea*) (*Süssner*) (TLMF); 2 ♂, Kochendorf, 1–6.vi.1869 (*Hofmann*); 5 ♂, 10 ♀, Hannover, e.l. 18–19.vi.1864 (*Stellaria holostea*) (*Glitz*); 1 ♀, Helmstedt (*Heinemann*) (BMNH). **Germany (East)**: 1 ♂, 1 ♀, [Neubrandenburg,] Friedland, e.l. 28–30.vi.1881 (*Stange*) (BMNH). **Czechoslovakia**: 1 ♂, Praha (*Nickerl*) (BMNH). **Hungary**: 1 ♂, Czerkut p. Pécs, 12–20.vi.1936 (*Klimesch*) (coll. Klimesch, Linz).

Taxa incertae sedis

Lita trinella Fuchs, 1903

Lita trinella Fuchs, 1903: 9. Holotype ♀, U.S.S.R.: Armenia S.S.R., Eriwan [not traced].

The possible affinities of this taxon are not evident from the original description. It is here included as it was stated to be closely related to *petryi* by Fuchs. The single type was not found and the whereabouts of the Fuchs collection is unknown.

Lita crepusculella Teich, 1889

Lita crepusculella Teich, 1889*a*: 111. Syntypes, U.S.S.R.: Latviya S.S.R. [not traced, probably lost].

L. crepusculella was described from two syntypes collected on 27 June and 2 July on swamp land near 'Kemmern' and 'Kurtenhof'; however, I could not trace these localities. According to the original description, *crepusculella* is related to *vicinella* and *fischerella*. Nevertheless, the real identity of this species remains obscure as the Teich collection was destroyed.

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Figs 6–11 Wings of *Caryocolum* species. 6, *C. fischerella* (Treitschke), no locality data. 7, *C. tischeriella* (Zeller), Austria. 8–10, *C. alsinella* (Zeller); (8), Italy; (9), paralectotype [*semidecandrella*], England; (10), paralectotype [*semidecandrella*], England. 11, *C. viscariella* (Stainton), England.

Figs 12–17 Wings of *Caryocolum* species. 12, *C. viscariella* (Stainton), Austria. 13, 14, *C. vicinella* (Douglas); (13), England; (14), England. 15, *C. bosalella* (Rebel), holotype, Sardinia. 16. *C. sciurella* (Walsingham), holotype [*rubidella*], Canary Islands. 17. *C. nepalense* Povolný, holotype, Nepal.

Figs 18–23 Wings of *Caryocolum* species. 18, 19, *C. longiusculum* sp. n.; (18), holotype, Afghanistan; (19), paratype, Afghanistan. 20, *C. vartianorum* sp. n., holotype, Afghanistan. 21, *C. tetrameris* (Meyrick), Afghanistan. 22, *C. paghmanum* sp. n., paratype, Afghanistan. 23, *C. mongolense* Povolný, holotype, Mongolia.

Figs 24–29 Wings of *Caryocolum* species. 24, *C. amaurella* (Hering), Sweden. 25, 26, *C. oculatella* (Thomann); (25), syntype, Switzerland; (26), Spain. 27–29, *C. petryi* (Hofmann); (27, 28), paralectotypes, East Germany; (29), Switzerland.

Figs 30–35 Wings of *Caryocolum* species. 30, *C. petryi* (Hofmann), Sweden. 31, *C. repentella* (Chrétien), Austria. 32, *C. afghanum* sp. n., paratype, Afghanistan. 33. *C. majus* sp. n., holotype, Afghanistan. 34, *C. splendens* Povolný, holotype, Iran. 35, species A, Iran.

Figs 36–41 Wings of *Caryocolum* species. 36–38, *C. inflativorella* (Klimesch); (36), paralectotype, Hungary; (37), holotype [*census*], Hungary; (38), paralectotype [*xuthella*], Yugoslavia. 39, 40, *C. saginella* (Zeller); (39), Italy; (40), Yugoslavia. 41, *C. cauligenella* (Schmid), lectotype, West Germany.

Figs 42–47 Wings of *Caryocolum* species. 42, *C. trauniella* (Zeller), paralectotype, Italy. 43, 44, *C. peregrinella* (Herrich-Schäffer); (43), Greece; (44), France. 45, *C. fiorii* (Klimesch), lectotype, Italy. 46, *C. provinciella* (Stainton), paralectotype, France. 47, *C. mucronatella* (Chrétien), lectotype [*poschiavensis*], Switzerland.

Figs 48–53 Wings of *Caryocolum* species. 48, *C. mucronatella* (Chrétien), Greece. 49, *C. simulans* sp. n., holotype, Syria. 50, *C. abhorrens* sp. n., Afghanistan. 51, *C. leucomelanella* (Zeller), lectotype, Poland. 52, *C. immixtum* sp. n., paratype, Afghanistan. 53, *C. leucothoracellum* (Klimesch), Italy.

Figs 54–59 Wings of *Caryocolum* species. 54, *C. schleichi schleichi* (Christoph), lectotype, U.S.S.R. 55, *C. schleichi dianthella* (Chrétien), Spain. 56, 57, *C. schleichi improvisella* (Rebel), Austria. 58, *C. schleichi arenariella* (Benander), Sweden. 59, *C. marmoreum marmoreum* (Haworth), Denmark.

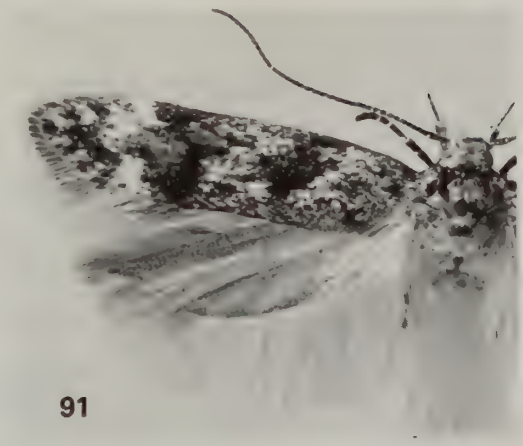
Figs 60–65 Wings of *Caryocolum* species. 60–62, *C. marmoreum marmoreum* (Haworth); (60), France; (61), Italy; (62), Canary Islands. 63, *C. marmoreum pulchrum* (Wollaston), Madeira. 64, 65, *C. pullatella* (Tengström); (64), U.S.A. (Arkansas); (65), Sweden.

Figs 66–71 Wings of *Caryocolum* species. 66, *C. pullatella* (Tengström), Canada. 67, *C. protectum* (Braun), paratype, U.S.A. (Kentucky). 68, *C. stramentella* (Rebel), lectotype, Turkey. 69, *C. emarginatum* sp. n., holotype, France. 70, *C. hispanicum* sp. n., holotype, Spain. 71, *C. confluens* sp. n., paratype, Greece.

Figs 72–77 Wings of *Caryocolum* species. 72, *C. fraternella* (Douglas), no locality data. 73, 74, *C. klosi* (Rebel); (73), lectotype, Austria; (74), West Germany. 75, *C. interalbicella* (Herrich-Schäffer), Austria. 76, *C. laceratella*, paratype [*thurneri*], Italy. 77, *C. nearcticum* sp. n., paratype, U.S.A. (Washington).

Figs 78–83 Wings of *Caryocolum* species. 78, *C. blandella* (Douglas), West Germany. 79, *C. blandelloides* Karsholt, paratype, Denmark. 80, *C. horoscopa* (Meyrick), Afghanistan. 81, *C. jaspidella* (Chrétien), holotype, Algeria. 82, *C. proximum* (Haworth), England. 83, *C. blandulella* (Tutt), paralectotype, England.

Figs 84–89 Wings of *Caryocolum* species. 84, *C. blandulella* (Tutt), Denmark. 85, *C. tricolorella* (Haworth), no locality data. 86, *C. fibigerium* sp. n., holotype, Spain. 87, *C. junctella* (Douglas), Austria. 88, *C. kasyi* sp. n., holotype, Afghanistan. 89, *C. extremum* sp. n., holotype, Nepal.



Figs 90–94 Wings of *Caryocolum* species. 90, *C. cassella* (Walker), Austria. 91, *C. moehringiae* (Klimesch), Austria. 92, *C. petrophilum* (Preissecker), Austria. 93, *C. huebneri* (Haworth), no locality data; 94, *C. kroesmanniella* (Herrich-Schäffer), West Germany.

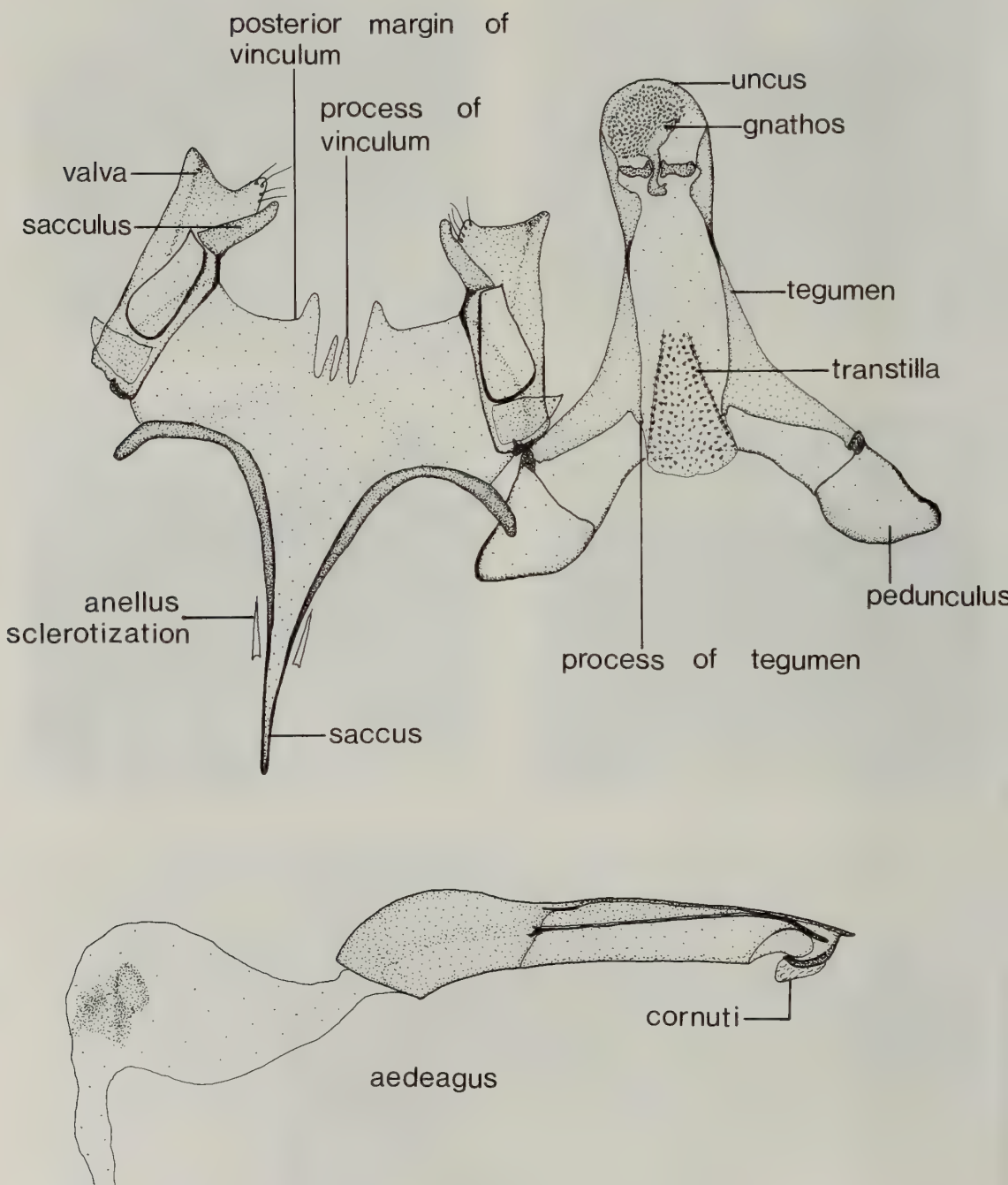


Fig. 95 Schematic diagram of the ♂ genitalia of *Caryocolum* combining some features of the different species-groups (unrolled preparation, aedeagus lateral view).

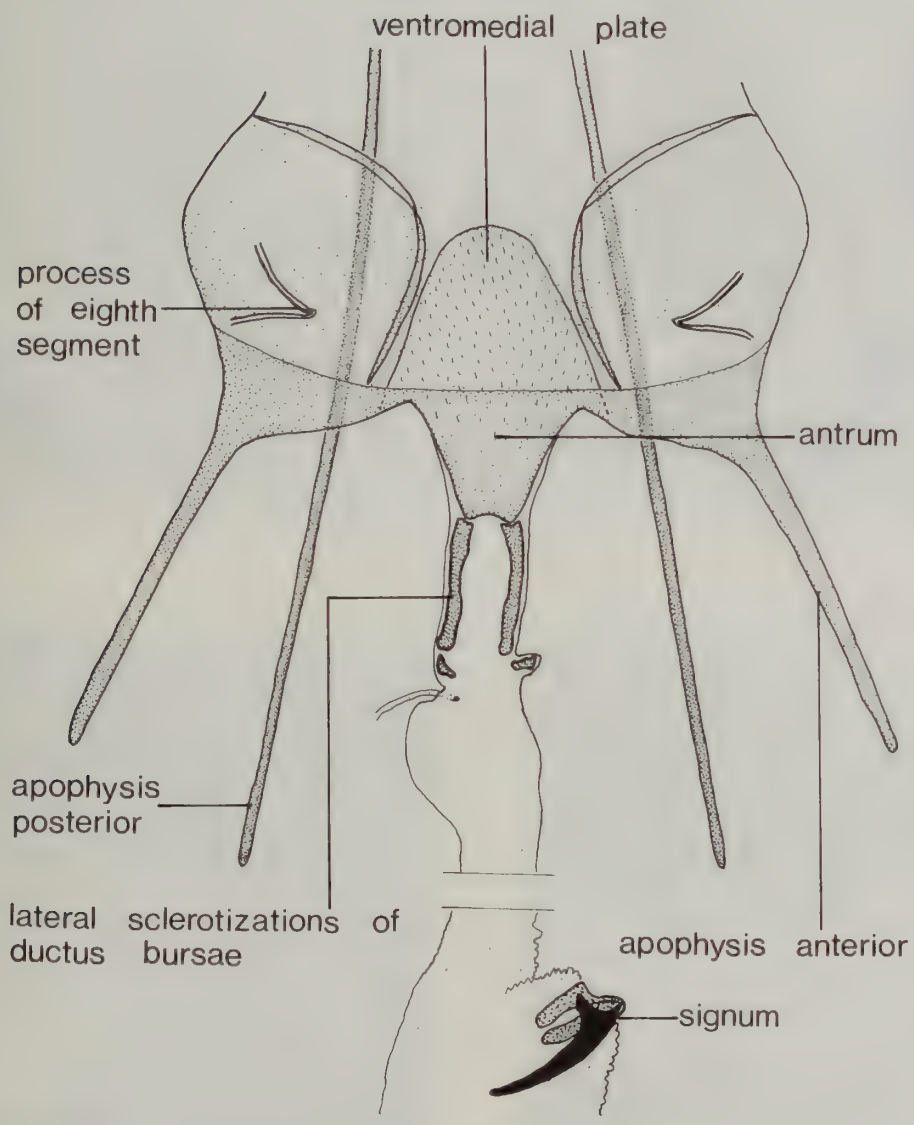
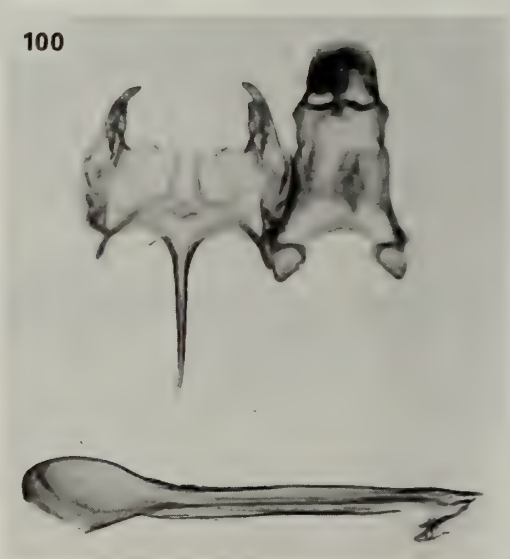
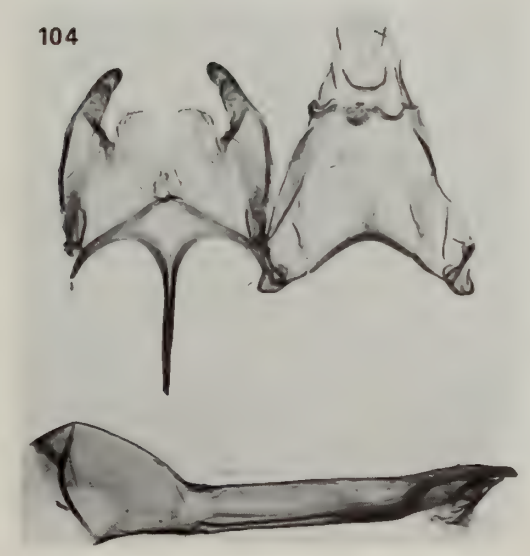


Fig. 96 Schematic diagram of the ♀ genitalia of *Caryocolum* combining some features of the different species-groups (unrolled preparation).



Figs 97–100 Genitalia of *Caryocolum* ♂. 97, *C. fischerella* (Treitschke), Czechoslovakia. 98, *C. tischeriella* (Zeller), East Germany. 99, *C. alsinella* (Zeller), Greece. 100, *C. viscariella* (Stainton), no locality data.

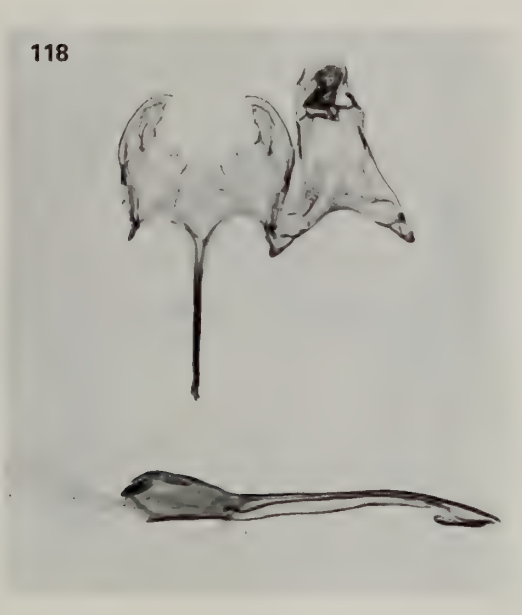


Figs 101–104 Genitalia of *Caryocolum* ♂. 101, *C. viscariella* (Stainton), aedeagus only, dorsal view, England. 102, *C. vicinella* (Douglas), England; aedeagus, Spain. 103, *C. bosalella* (Rebel), holotype, Sardinia. 104, *C. sciurella* (Walsingham), paratype, Canary Islands.

Figs 105–108 Genitalia of *Caryocolum* ♂. 105, *C. nepalense* Povolný, Nepal. 106, *C. longiusculum* sp. n., holotype, Afghanistan. 107, *C. tetrameris* (Meyrick), Afghanistan. 108, *C. paghmanum* sp. n., holotype, Afghanistan.

Figs 109–112 Genitalia of *Caryocolum* ♂. 109, *C. mongolense* Povolný, holotype, Mongolia. 110, *C. amaurella* (Hering), Norway. 111, *C. oculatella* (Thomann), syntype, Switzerland. 112, *C. petryi* (Hofmann), no exact locality data.

Figs 113–116 Genitalia of *Caryocolum* ♂. 113, *C. repentella* (Chrétien), Austria. 114, *C. afghanum* sp. n., holotype, Afghanistan. 115, *C. majus* sp. n., paratype, Afghanistan. 116, *C. splendens* Povolný, holotype, Iran.



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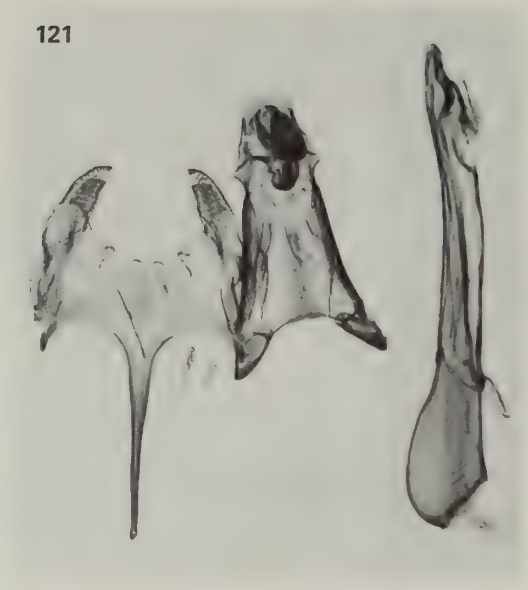

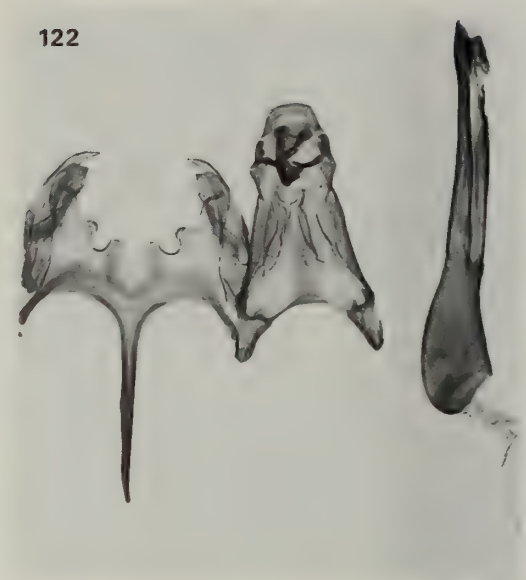

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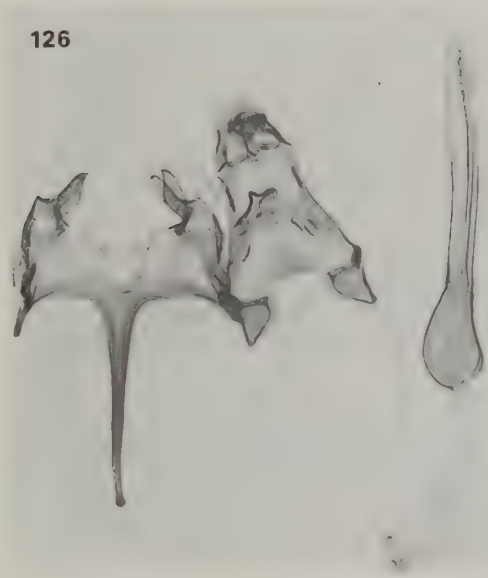

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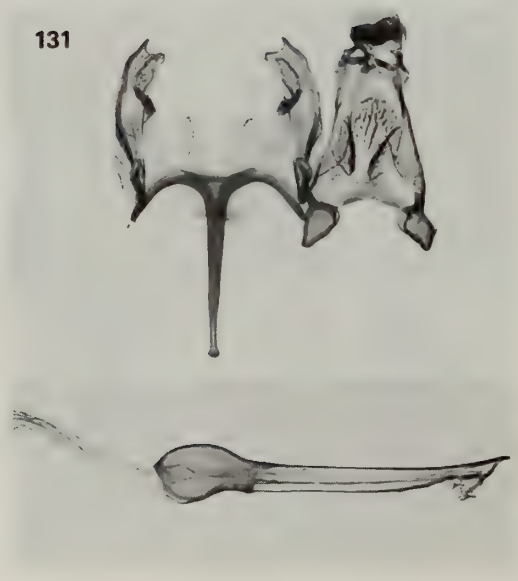

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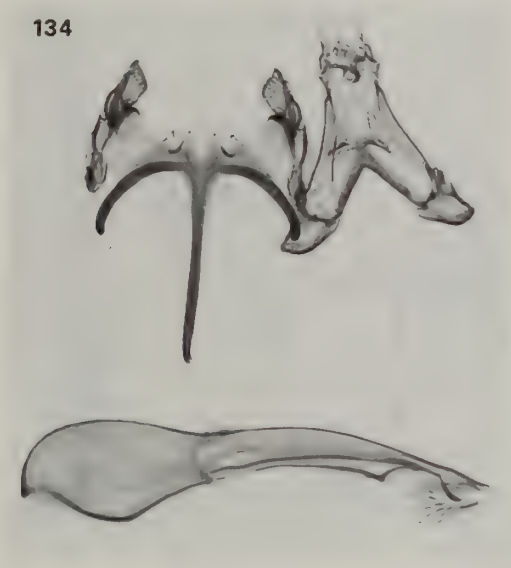

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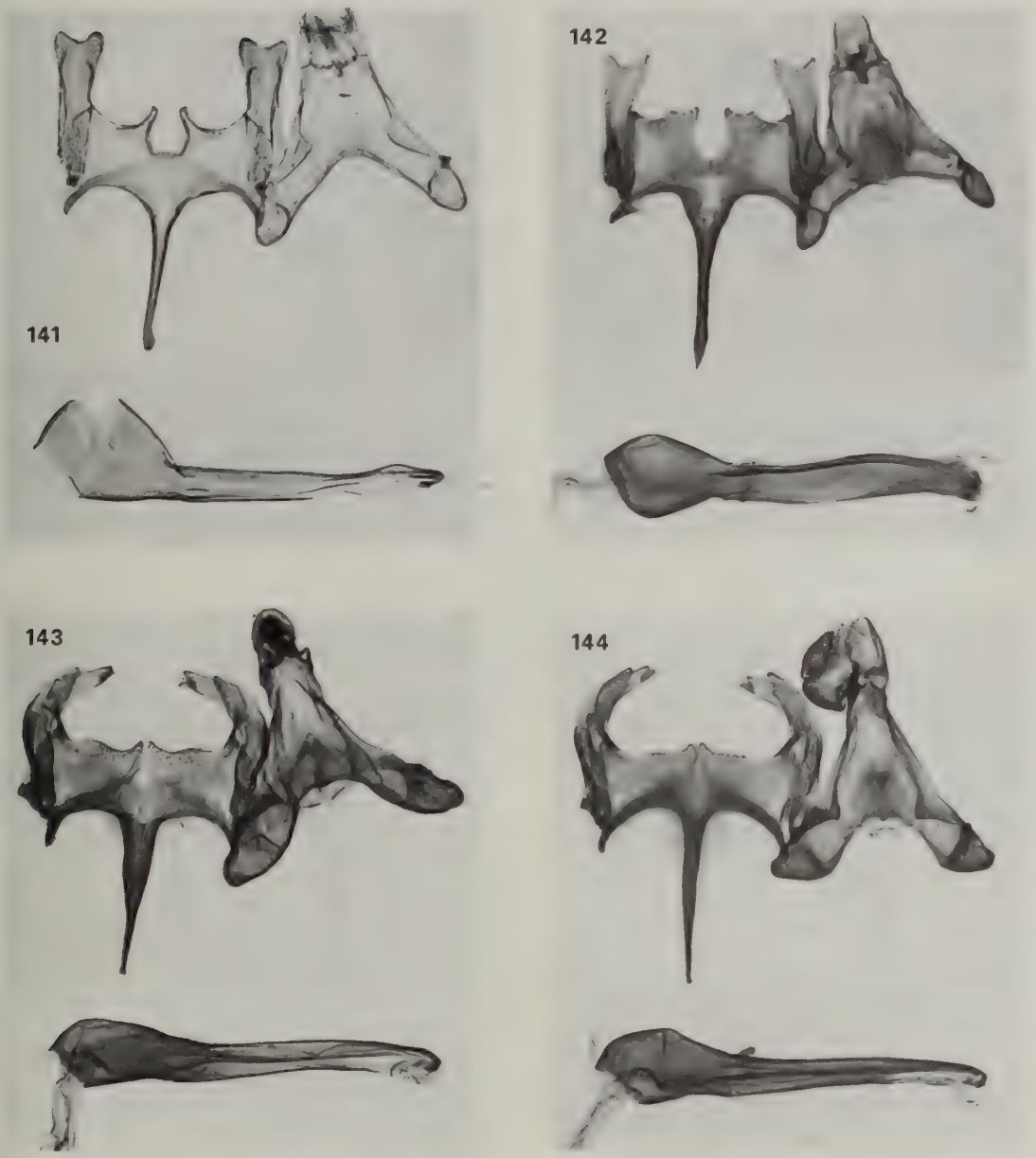

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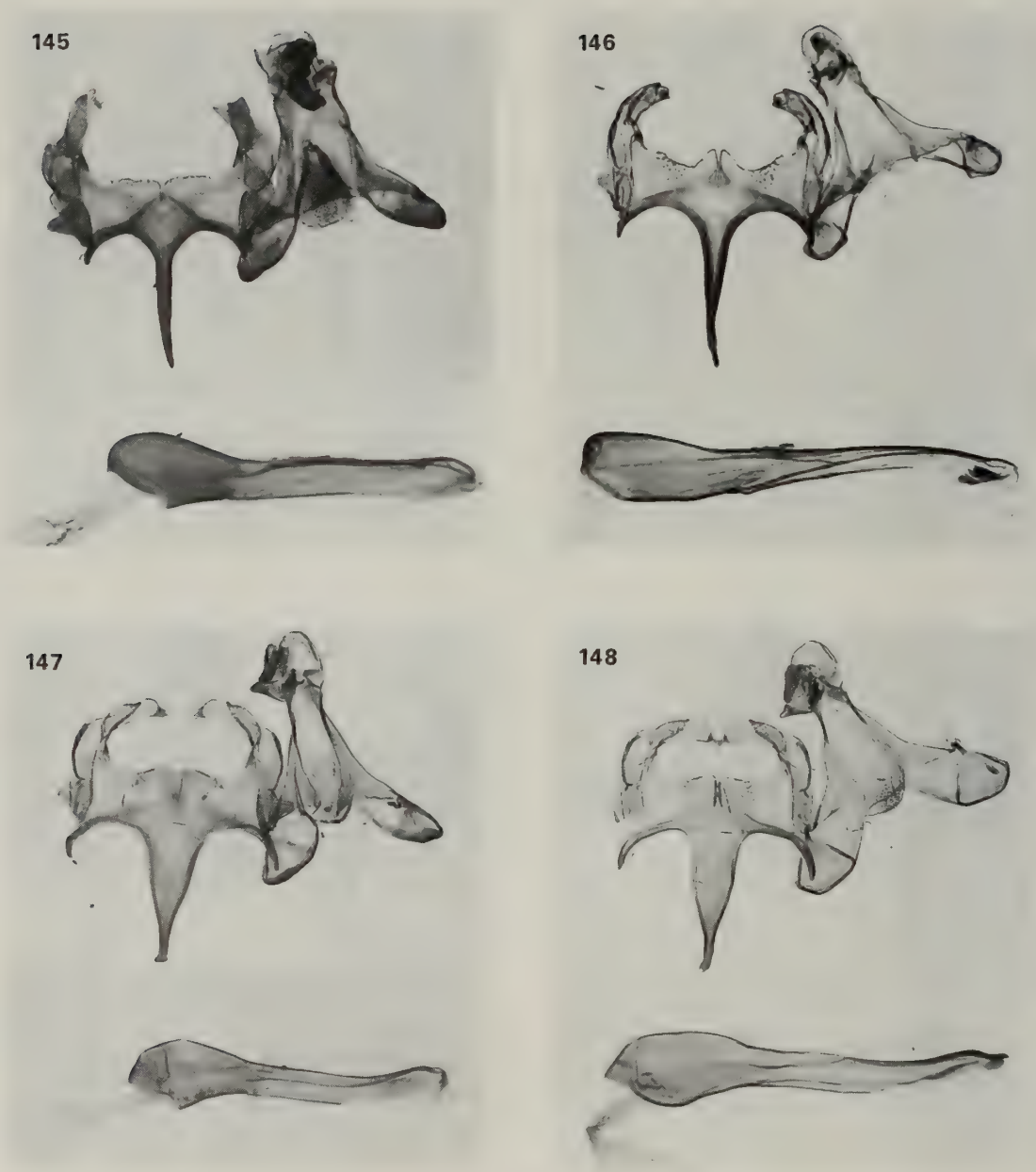

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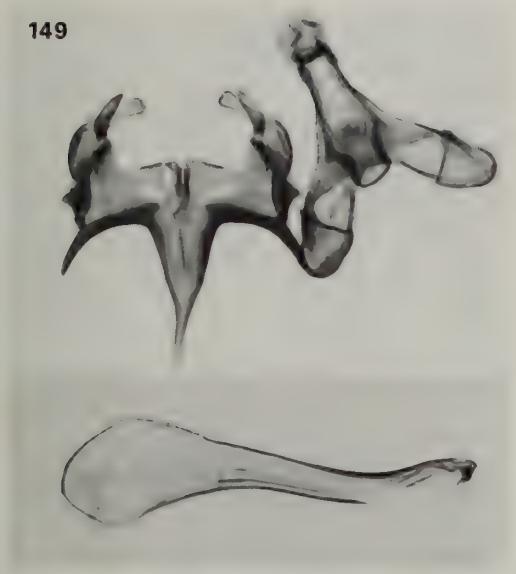

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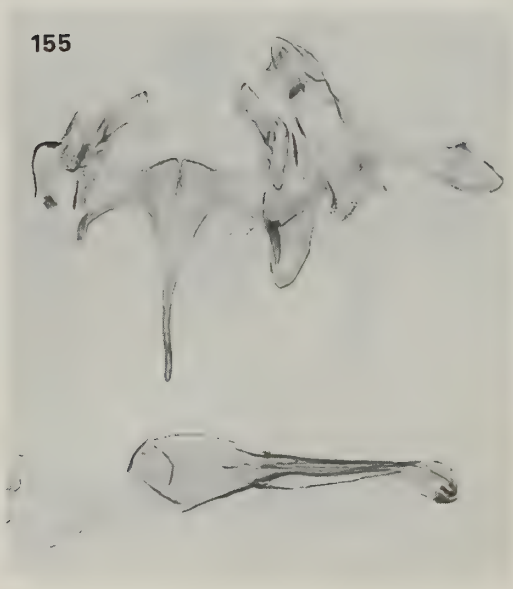

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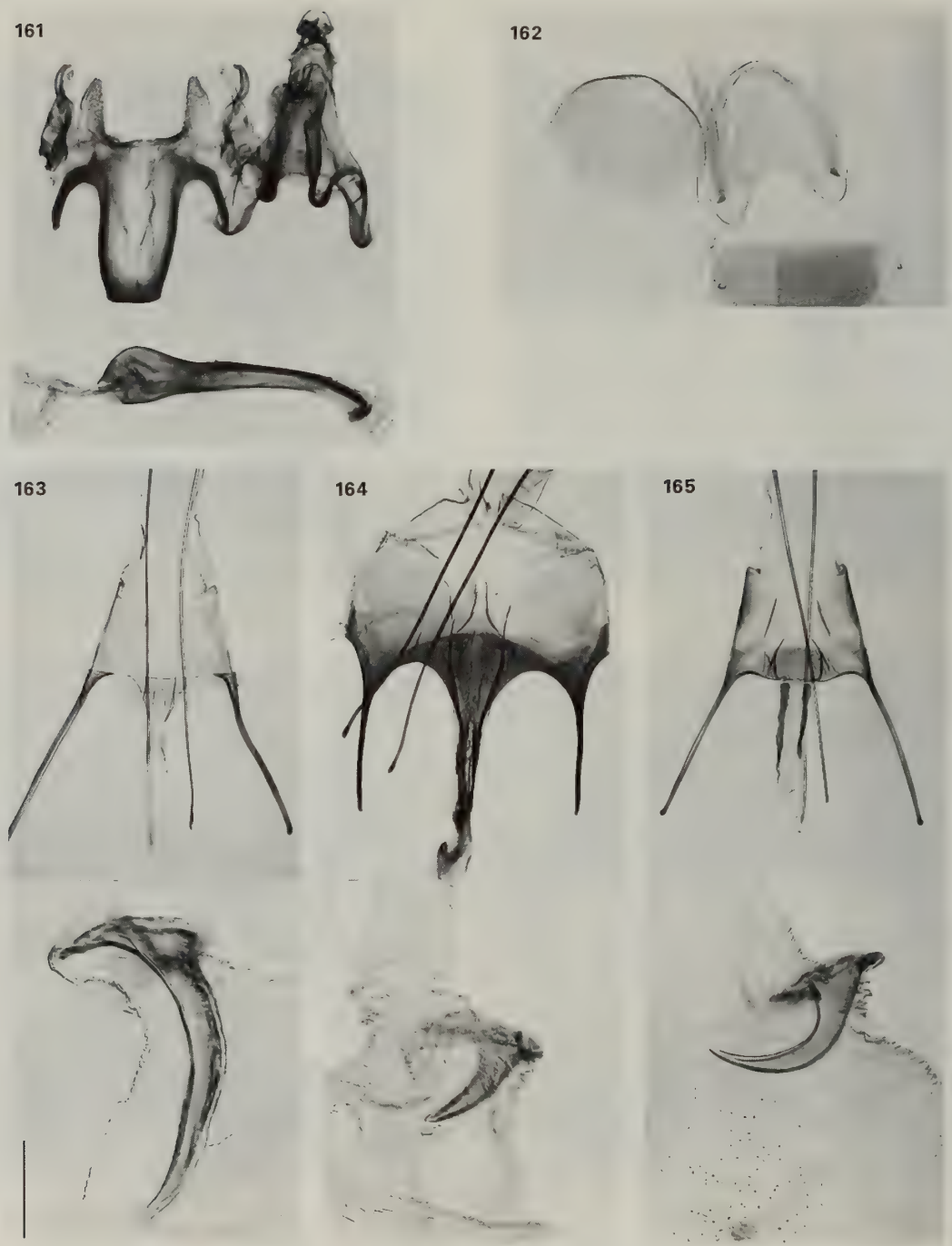

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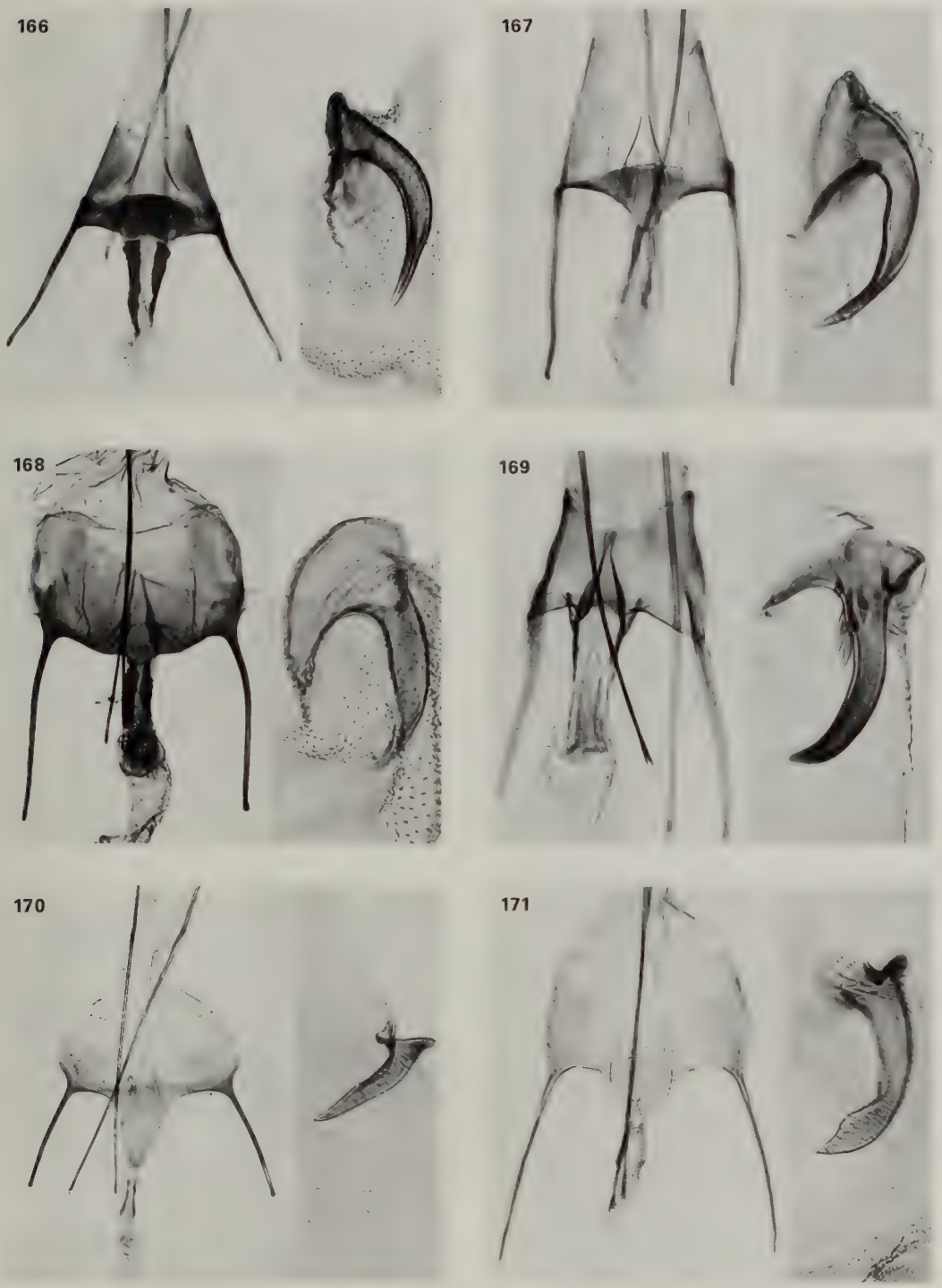

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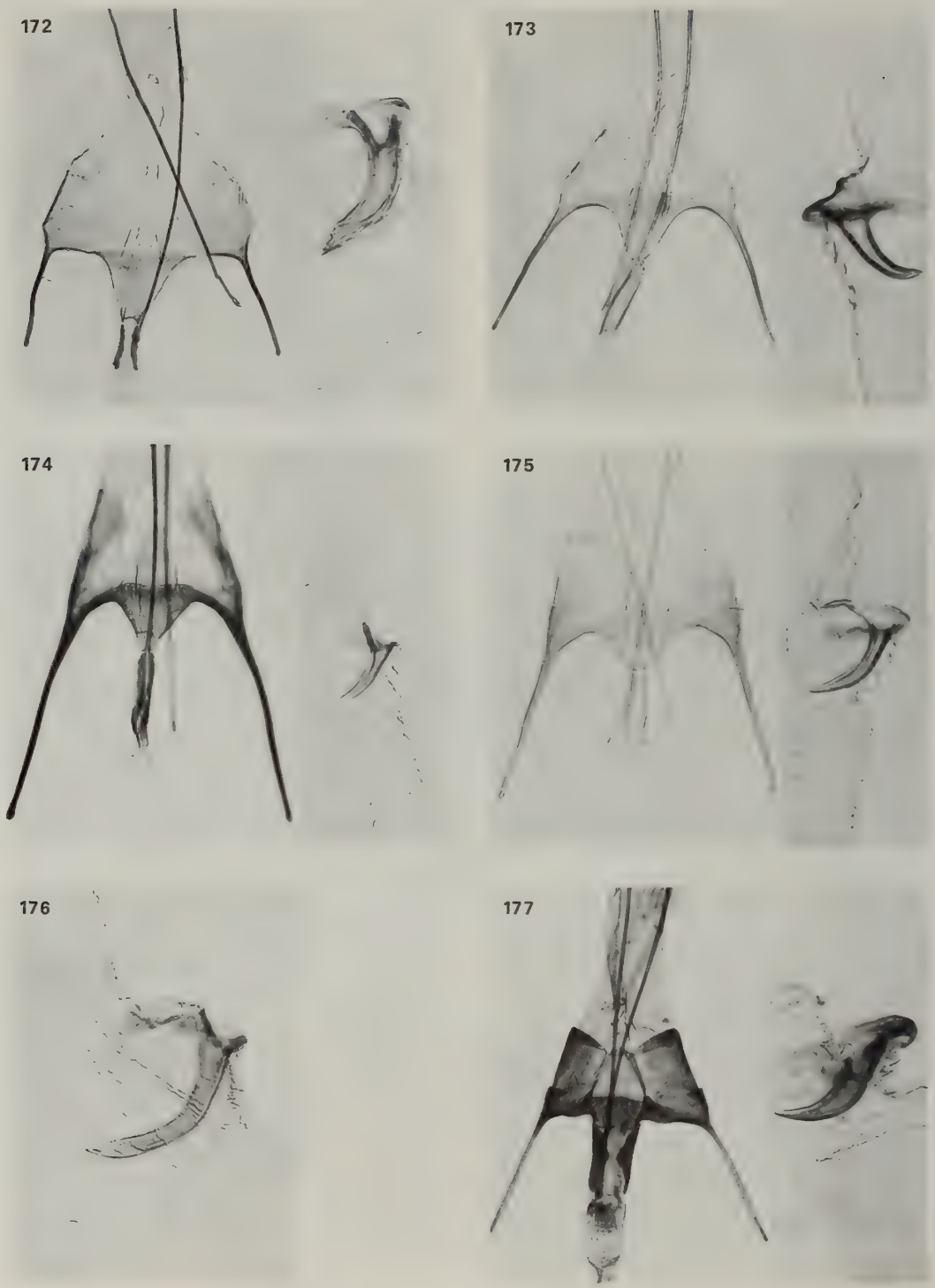

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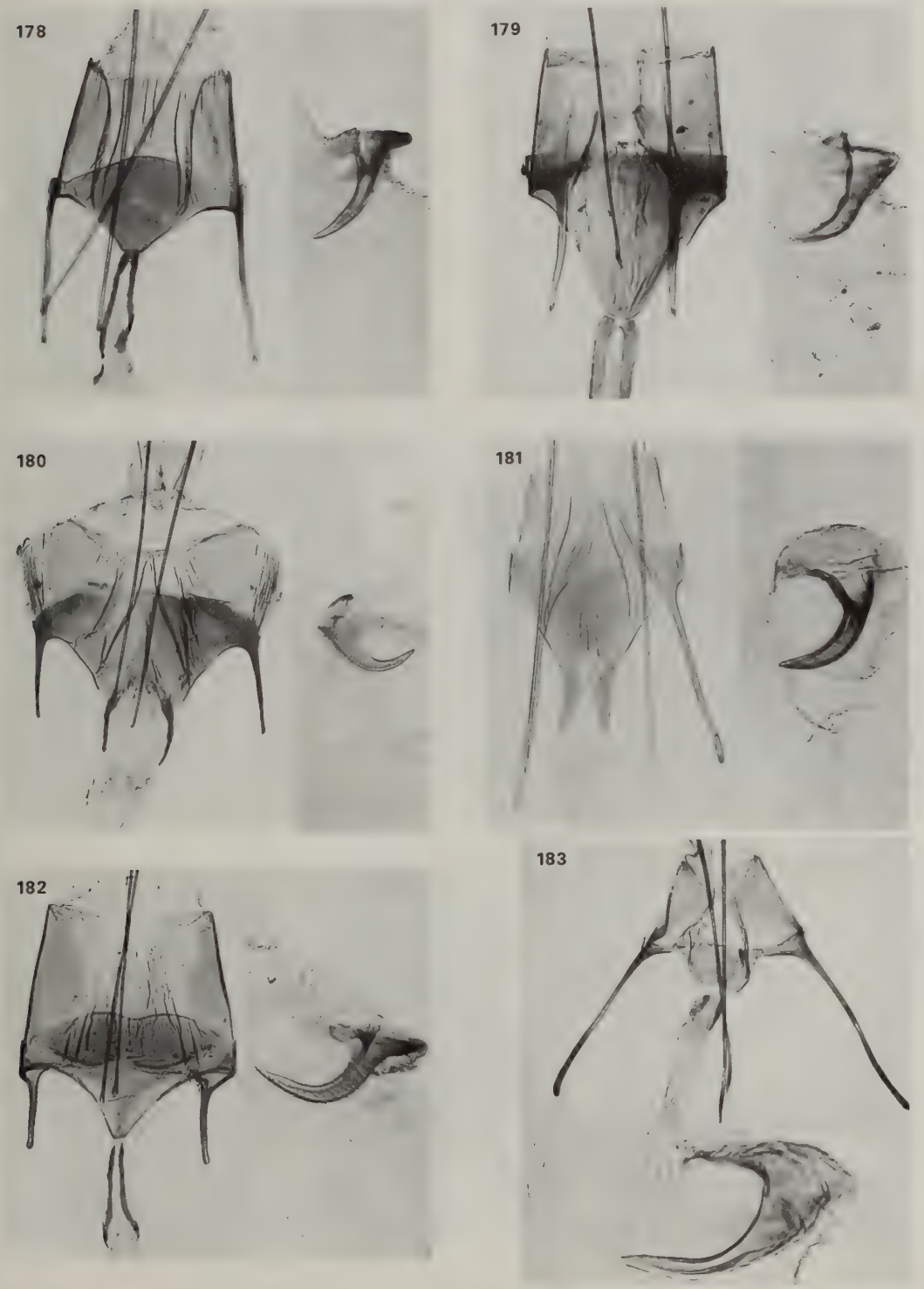

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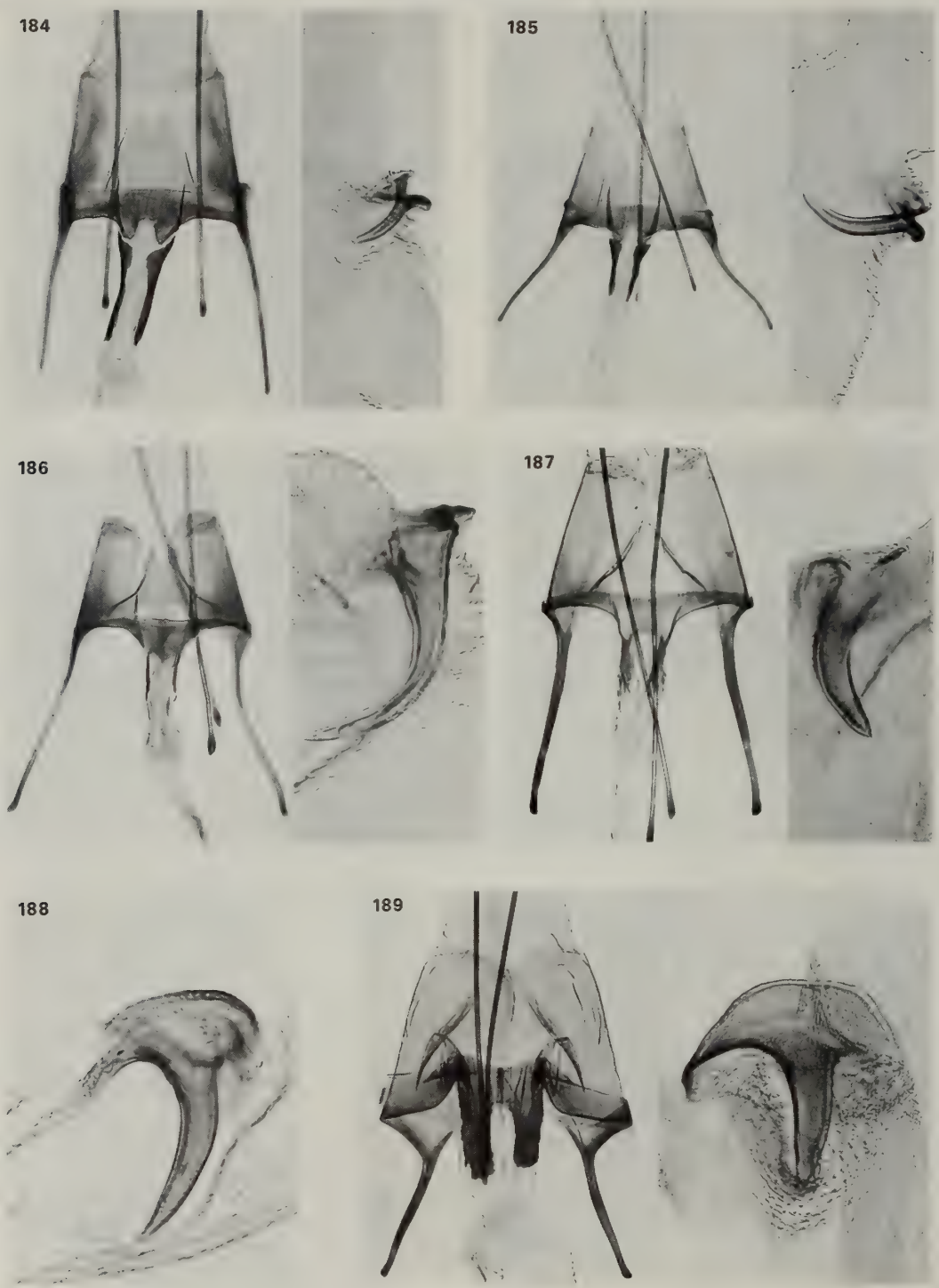

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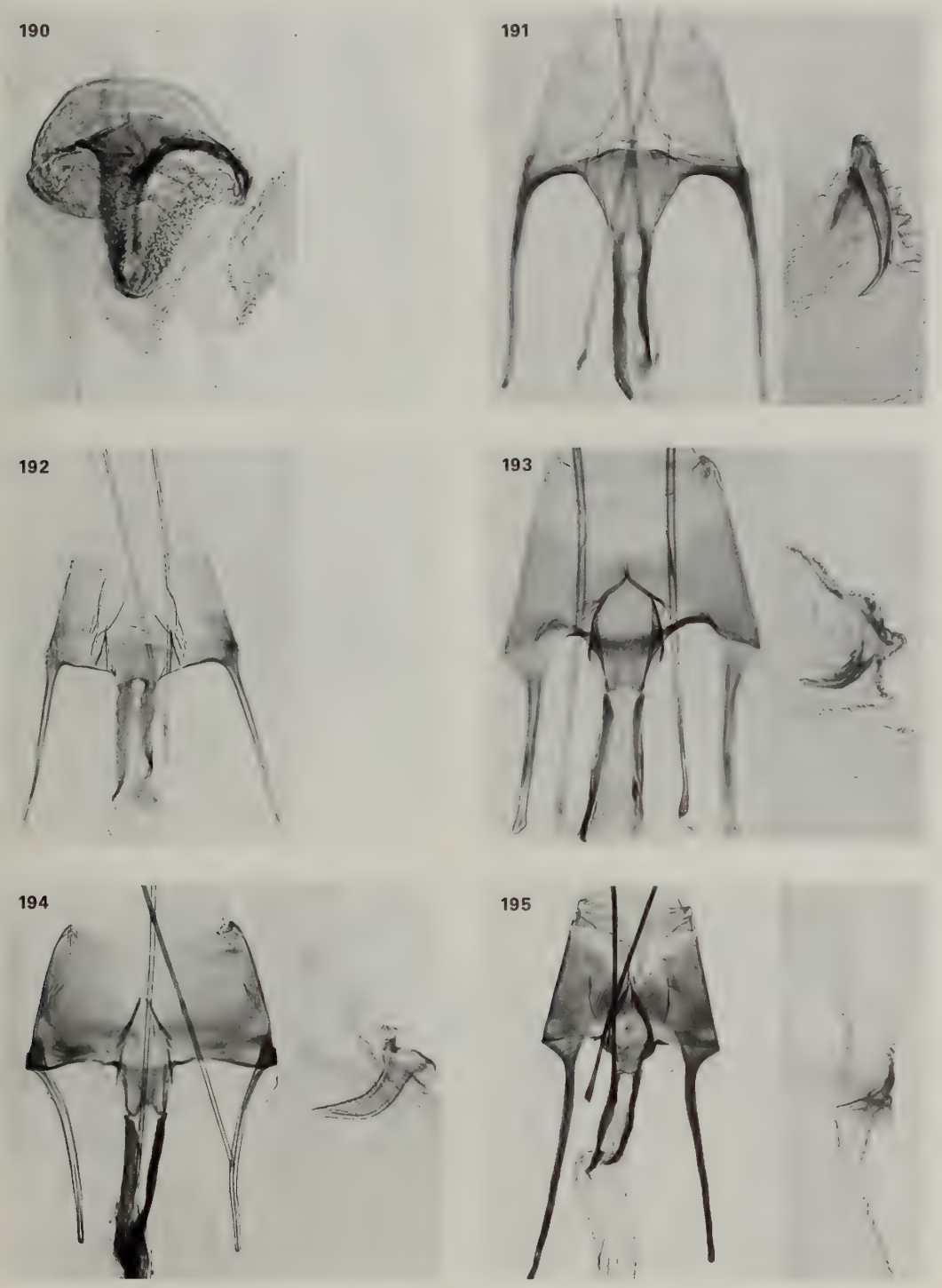

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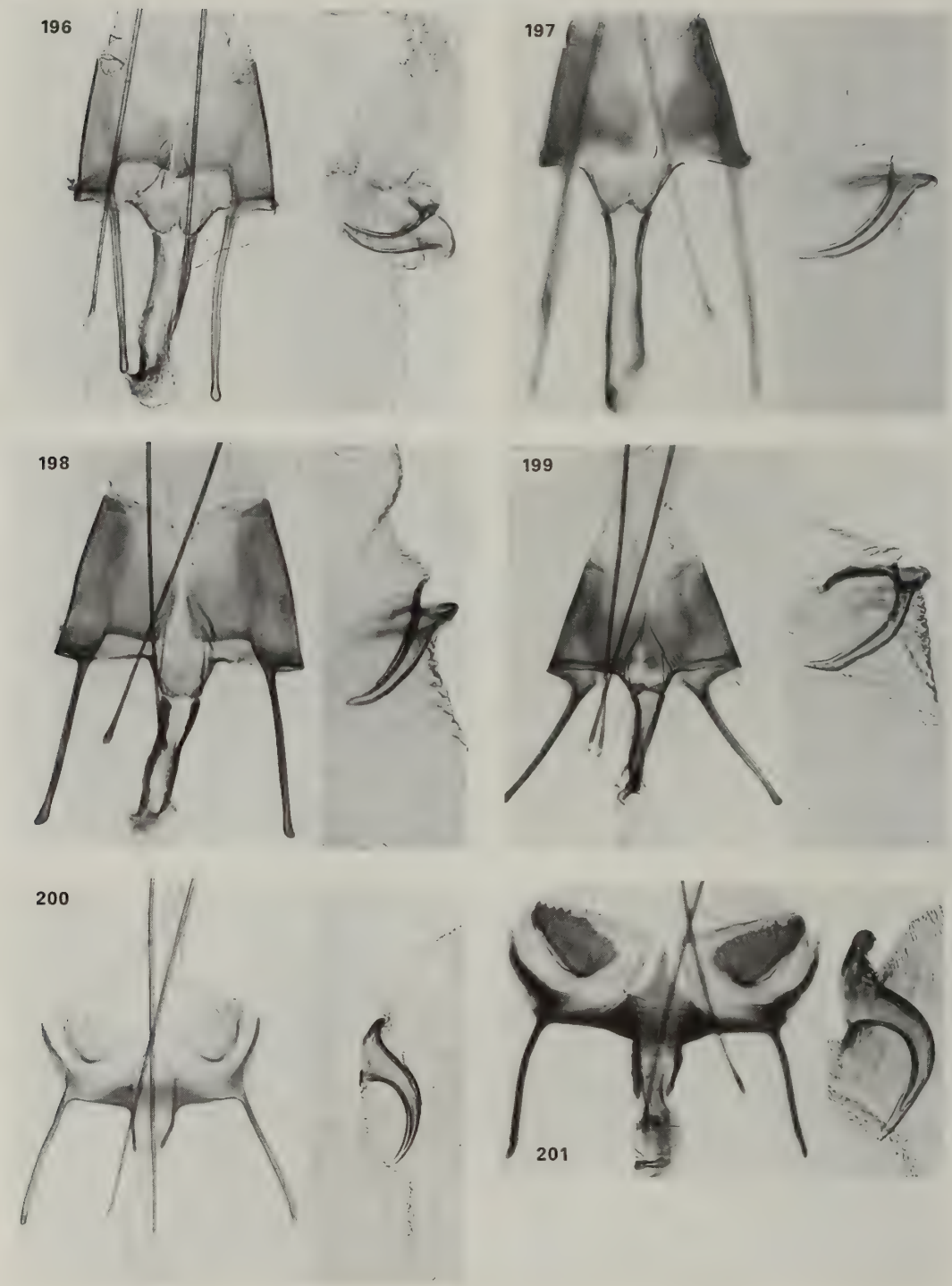

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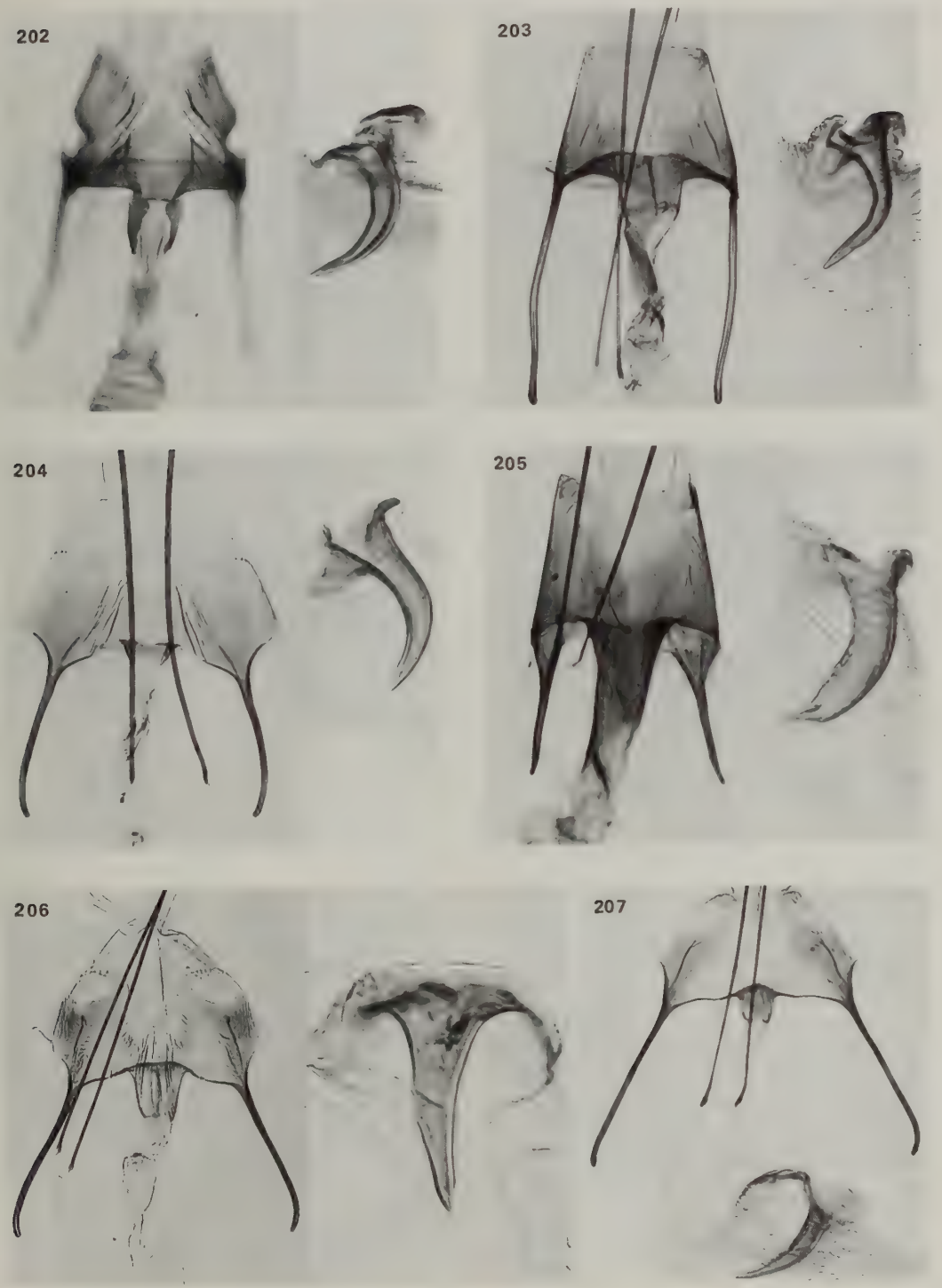

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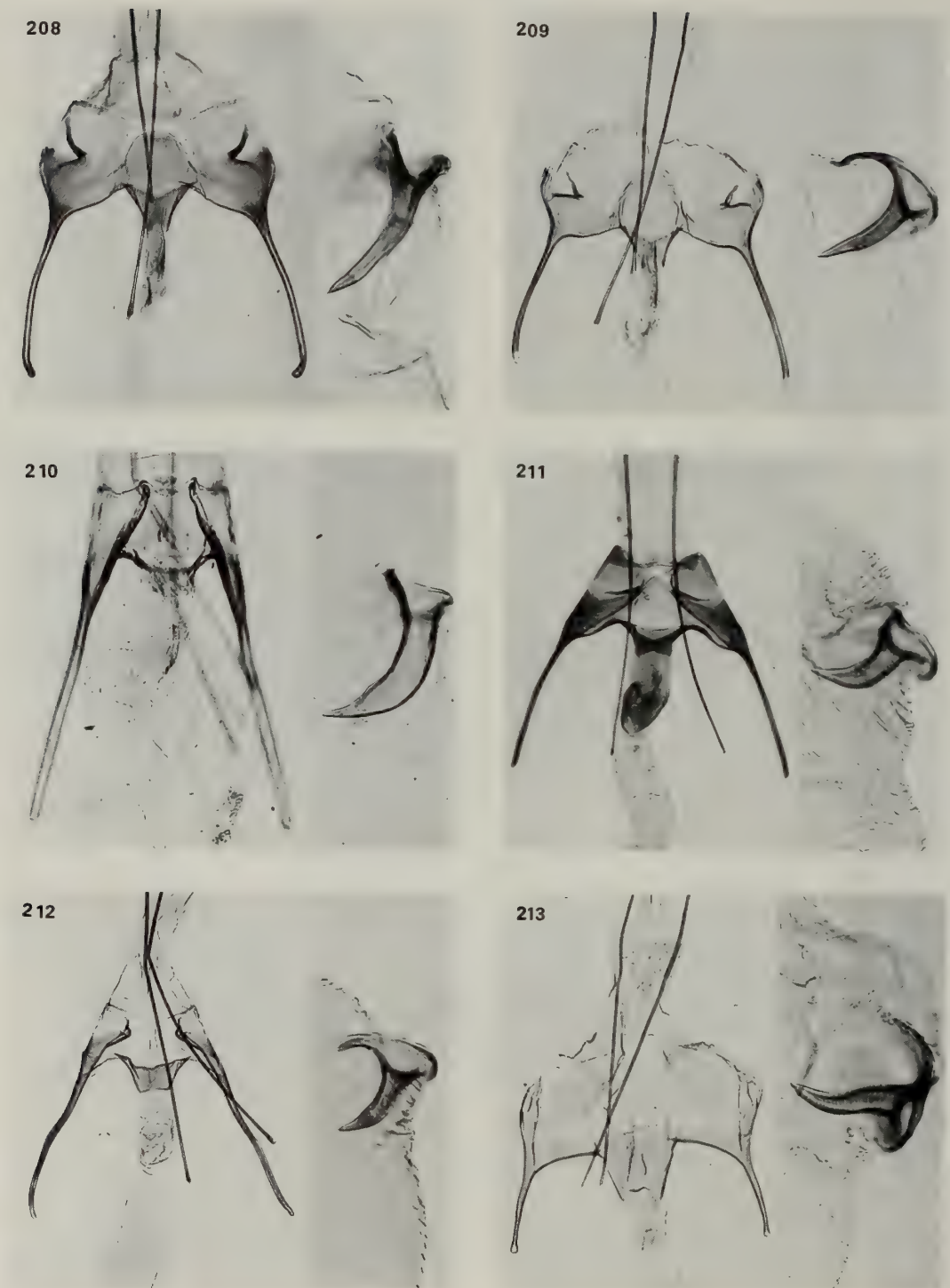

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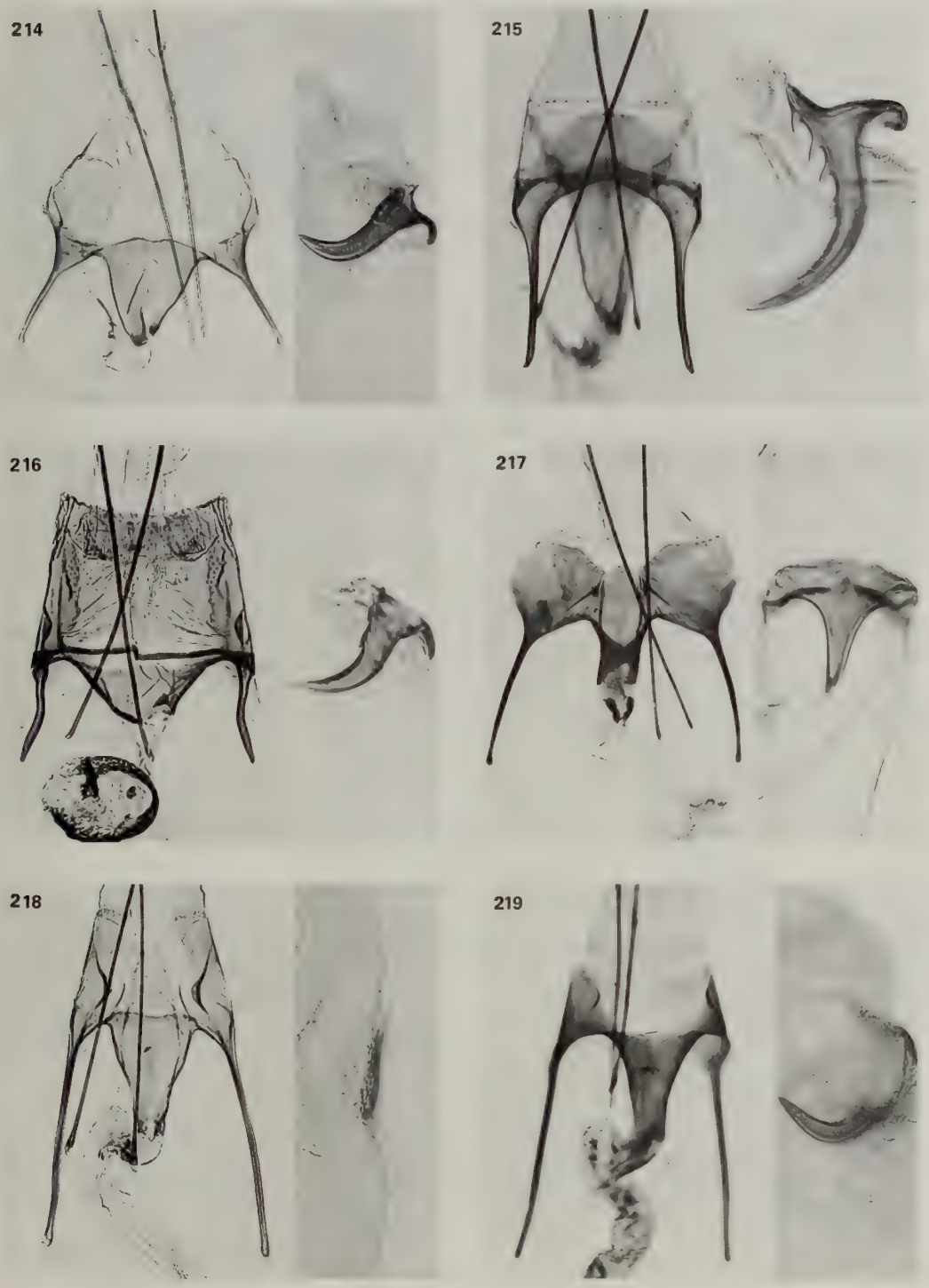

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